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ABSTRACT

The purpose of the study was to compare the math skills developed by students in two types of classrooms: "continuous progress" and "traditional." Data were collected through the use of tests, teacher questionnaires, and classroom observation. The data are supportive of "continuous progress" classes. Students in that setting outscored their counterparts in "traditional" classes on end-of-the-year mathematics tests. There was some evidence, however, that benefits of "continuous progress" classes did not accrue to students with poorly developed mathematics or reading skills. Process data suggests that the instructional staff examine the "continuum packet" model to insure that it does not foster (1) an undue focus on mechanical mathematics skills in contrast to problem-solving skills or (2) a methodical instructional setting that might lack motivational features for students. (Author)

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FORT WORTH, TEXAS

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DEPARTMENT OF RESEARCH AND EVALUATION

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A COMPARISON OF "CONTINUOUS PROGRESS" AND "TRADITIONAL" CLASSES IN THREE MIDDLE SCHOOLS

Prepared for

Dr. Julius Truelson, Superintendent

Fort Worth Independent School District

by

Charles L. Evans, Ed.D.

Director of Research/Evaluation

July, 1973

Director
Research and Evaluation

DATE: August 17, 1973

TO: Gerald Ward

FROM: Charles L. Evans

SUBJECT: Evaluation of "Continuous Progress" Classes

Accompanying this letter are two copies of a study conducted by the Department of Research and Evaluation. The purpose of the study was to compare the math skills developed by students in two types of classrooms: "continuous progress" and "traditional". Data were collected through the use of tests, teacher questionnaires, and classroom observation.

The data are supportive of "continuous progress" classes. Students in that setting outscored their counterparts in "traditional" classes on end-of-the-year mathematics tests. There was some evidence, however, that benefits of "continuous progress" classes did not accrue to students with poorly developed mathematics or reading skills.

Process data suggests that the instructional staff examine the "continuum packet" model to insure that it does not foster 1) an undue focus on mechanical mathematics skills in contrast to problem-solving skills or 2) a methodical instructional setting that might lack motivational features for students.

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INTRODUCTION

Description of Instruction Programs

In order to improve the individualization of instruction at the middle school level a plan was adopted by which students might progress individually and independently through packets of mathematics activities of increasing complexity. These activities were grouped into phases and levels, all of which were part of and related to a mathematics continuum of skills. In this setting, teachers or teams of teachers monitored students progress and provided help as needed. This instructional model was referred to as a "continuous progress" plan and was implemented at the middle school level in 1971-72.

At the beginning of the school year 1972-73 parents at three middle schools were given an opportunity to choose either the "continuous progress" or the "traditional" instructional plan for their children. The latter plan involved a regular self-contained class moving together through a textbook.

The textbooks utilized by students in "regular" classrooms were Sets and Numbers 6 (Singer-Random House) for grade six and School Mathematics I and II (Addison-Wesley) for grades seven and eight. Packets referred students to whatever textbook was appropriate to the level of work from the Houghton-Mifflin series for grades seven and eight and the Holt Rinehart Winston text for grade six. The bases

for the selection of textbooks are explained by the mathematic's consultant in Appendix A.

This procedure set up an experimental-control situation in each of these three schools, and the research department was assigned the task of examining the effects of the two instructional plans.

Design of the Evaluation

Discussion sessions were held by the investigator with each school mathematics teaching staff, the site principal, the consultant for mathematics, and other central administrative personnel concerned with instruction. The major purposes of these explanatory meetings were to 1) identify an appropriate instrument to measure the year's progress of students and 2) gather descriptive data concerning the implementation of the "continuous progress" plan at each school.

Prescriptive Math Inventory

The instrument identified as a result of these discussions was the Prescriptive Math Inventory (PMI), a criterion-type test. The Purple Book, designed to cover math content generally taught nationally in grades six and seven, was administered to sixth graders. Book C, designed to cover math content taught nationally at grades seven and eight, was administered to seventh and eighth graders.

The sixth grade test contained 169 problems measuring 153 objectives; the seventh-eighth contained 193 problems measuring 116 objectives. Students were tested over a period of two days, each student taking as long as he chose. There was no time limit on the tests.

The tests were administered by the math team, usually by grade levels, with students from "continuous progress" and "traditional" classes tested together.

Practice tests were administered to students a day or so prior to the actual test administration to provide practice in the mechanics of responding to the unique format.

Statistical Analysis of PMI Results

Results of criterion tests are reported, for groups, simply in terms of the percentages of students who correctly worked each problem. Group reports were attained for students in "continuous progress" classes and for students in "traditional" classes, allowing comparisons of the success of each group of students on each objective (or problem) on the tests. This comparison was made for each math objective and for groups of objectives that were similarly classified.

The mathematics subtests of the Iowa Test of Basic Skills administered at the beginning of the school year were available for use as a pre-measure of the math ability of students. This pre-measure was useful in statistically (ANCOVARY) adjusting PMI total raw scores (number right) for initial pre-year differences in the competencies of students entering "traditional" classes and those entering "continuous progress" classes.

Reading ability was also obtained from the fall ITBS and examined to determine whether or not any interaction between reading and mathematics ability was affecting the dependent variable (math achievement).

This analysis involved the use of a two-way analysis of covariance design and a three-dimensional, factorial analysis of variance design.

Subjects

All classes whether "continuous progress" or "traditional" at the three middle schools were included in the overall evaluation as were all teachers. However, only students completing their required two trimesters of mathematics were tested. The PMI was administered at the end of the winter trimester in order to remand results to schools prior to the end of the school year.

Only students at two middle schools were tested because no students were scheduled to complete their year's mathematics in "traditional" classes at the end of the winter trimester.

All classes at the three middle schools were utilized for observational purposes during the spring trimester.

In order to determine if the choice of instructional plan given students in the fall resulted in an unequal distribution of ability in the two types of classes, measures of math competence of sixth and eighth graders taken early in the fall were examined. The two distributions are depicted in Table I, one for students choosing "continuous progress" classes and one for students choosing "traditional" classes. It may be seen that the proportion of students scoring at each stanine were similar except at the upper levels. Students with higher math ability were more likely to be found in "continuous progress" classes at both the sixth and the eighth grade level.

Table 1

Distribution* of October ITBS Scores, Grade 6 and 8,

Math Subtest Total

	Percentages of Students in Each Stanine								
	1	2	3	4	5	6	7	8	9
Grade 6									
Continuous Progress	5.7%	4.8%	12.2%	15.9%	18.2%	15.9%	11.4%	9.6%	5.7%
Traditional	3.9%	7.6%	11.7%	19.4%	23.5%	16.9%	8.5%	6.3%	1.7%
Grade 8									
Continuous Progress	3.9%	9.3%	13.5%	17.8%	26.1%	13.4%	8.6%	4.8%	2.2%
Traditional	5.4%	13.3%	17.1%	23.3%	26.4%	10.5%	2.8%	.7%	None

* Source of data: ITBS List Reports, 1972-73.

The extent to which students chose "continuous progress" and "traditional" classes is shown in Table 2.

Table 2

Choice of Student* in 1972-73 in Grades 6 and 8

	Grade 6		Grade 8		Total	
	CP	T	CP	T	CP	T
School A	237	157	185	179	(56%) 422	(44%) 336
School B	417	169	452	139	(74%) 869	(26%) 308
School C	244	81	249	101	(73%) 493	(27%) 182
Total	898 (69%)	407 (31%)	886 (68%)	419 (32%)	1784 (68%)	826 (32%)

*Source: ITBS Fall, 1972 List Reports (Grade 7 not included).

Approximately one-third (32 percent) of the sixth and eighth graders chose "traditional" classes; two-thirds of the students (68 percent) chose "continuous progress" classes. The proportions "continuous progress" to "traditional" students varied from school to school but not by grade level.

Classroom Observation

Each class at each of the three middle schools were monitored by two observers simultaneously for one complete class period during the early part of the spring trimester.

The observers focused on a different aspect of classroom activities. One utilized a structured observational guide to record the teacher's

and the total class's activities. The guide was in two parts: one dealing with the type of instructional activity and one part dealing with student reaction to the activity. Observations were quantified for each part of the guide.

The second observer focused on individual students, identified as those sitting diagonally across the classroom. It was expected that this type of student selection would preserve the anonymity of the study and provide a random group. Neither the teacher nor the student was aware of the observation of individual students.

The observational instrument was constructed by the Research Department to include aspects of "continuous progress" classes about which concern had been expressed by educators and/or parents.

The schedule for observing choices is presented as Appendix B. It provided for observation of all teachers, at each grade level, and equally in both of "continuous progress" and "traditional" classrooms.

Staff Comparisons

Differences in the competence of teachers may create effects for which special instructional model may be given credit. To help assess this uncontrolled variable, certain demographic data that might influence instructional effects were obtained and compared for teachers of "traditional" and "continuous progress" classes. These data are reported in Table 3 . Only that data describing the staffs of the two middle schools at which test results were reported in the previous section are included.

Table 3

Summarization of Teacher Characteristics of Students Tested

Characteristic	Teachers of "Traditional" classes		Teachers of "Continuous Progress" classes	
Sex	males	(4)	males	(0)
	females	(2)	females	(9)
Ethnicity	white	(5)	white	(9)
	black	(1)	black	(0)
Age	20-29	(3)	20-29	(4)
	30-49	(1)	30-49	(3)
	50 +	(2)	50 +	(2)
Degree	bachelors	(6)	bachelors	(7)
	masters	(0)	masters	(2)
Experience	0-3	(3)	0-3	(2)
	4-14	(2)	4-14	(5)
	15 +	(1)	15 +	(2)

Differences in teacher characteristics did not seem to be great in terms of 1) ethnicity 2) age or, 3) degree held.

However, it may be perceived that 1) males and 2) teachers with least teaching experience were more likely to have been assigned to "traditional" classes.

This examination of variables that might possibly affect instructional results indicated some slight advantage for "continuous progress" classes in terms of teacher experience. However, it is recognized that research data from the educational domain has not been able to provide strong support for the contention that these variables are actually correlated with student achievement.

TEST RESULTS

The Prescriptive Mathematics Inventory was administered to all students completing two trimesters of mathematics at two middle schools. Scores on the instrument, measuring specific mathematics objectives, are reported generally in terms of percentages of students credited with attaining each objective. Students receive credit for objective-attainment if they work the problem or problems related to the objective. This type of report allowed a comparison of the success of students taught in "continuous progress" classes with that of those taught in "traditional" classes.

Test results were examined in three ways. First, a direct comparison of the success of each group of students was made. Secondly, success on the test was statistically adjusted to allow for initial differences between the two groups in mathematic ability as measured by the Iowa Test of Basic Skills (ITBS) mathematics subtests. Third, test results were examined in light of students' reading ability, as measured by the ITBS.

Actual Test Results

A comparison of the test success of "traditional" and "continuous progress" students is shown in Tables 4-6 by categories of mathematics skills. The percentages reflect the median percent of students correctly working the test problems related to the various mathematics topics. The actual percentages of students working each problem (or set of problems) are shown in Exhibits A-C.

It should be recognized, in assessing the test success, that few students, if any, had studied all of the skills included on the test.

Table 4 A Comparison of the Test Success of Sixth Grade Traditional and Continuous Progress Students at Two Middle Schools

Math Topic	Percent* of Students Correctly Working Problems in each Math Category	
	Conventional Students (N=112)	Continuous Progress Students (N=192)
1. Pre-Operational Concepts	47%	62%
2. Addition	Fractions 24% / Decimals 77%	Fractions 47% / Decimals 78%
3. Subtraction	Fractions 17% / Decimals 64%	Fractions 45% / Decimals 69%
4. Multiplication	Int. 55% / Fract. 23% / Dec. 50%	Int. 67% / Fract. 46% / Dec. 44%
5. Division	Int. 65% / Fract. 12% / Dec. 33%	Int. 79% / Fract. 44% / Dec. 29%
6. Properties	59%	41%
7. Miscellaneous	46%	60%
8. Number Theory	29%	55%
9. Measurement	43%	64%
10. Non-Metric Geometry	33%	42%
11. Numeration System	29%	34%
12. Percent	29%	33%
13. Sets	47%	56%
14. Statistics	9%	28%
15. Problem Solving	30%	37%
Aggregate (Median %)	41%	52%

*Median percent for the category

Table 5 A Comparison of the Test Success of Seventh Grade Traditional and Continuous Progress Students at Two Middle Schools

Math Topic	Percent* of Students Correctly Working Problems in each Math Category	
	Conventional Students (N=130)	Continuous Progress Students (N=182)
1. Pre-Operational Concepts	32%	65%
2. Operations	Integers 40% Fractions 12%	Integers 60% Fractions 46%
3. Properties	42%	72%
4. Miscellaneous	14%	43%
5. Number Theory	16%	15%
6. Measurement	1%	12%
7. Non-Metric Geometry	22%	25%
8. Numeration System	23%	38%
9. Percent	35%	49%
10. Sets	42%	52%
11. Statistics	31%	46%
12. Probability	1%	4%
13. Functions and Graphs	0%	2%
14. Trigonometry	1%	2%
15. Problem Solving	69%	77%
Aggregate (Median %)	22%	43%

*Median percent for the category.

Table 6 A Comparison of the Test Success of Eighth Grade Traditional and Continuous Progress Students at Two Middle Schools

Math Topic	Percent* of Students Correctly Working Problems in each Math Category			
	Conventional Students (N=73)		Continuous Progress Students (N=80)	
1. Pre-Operational Concepts	73%		80%	
2. Operations	Integers 62%	Fractions 36%	Integers 78%	Fractions 56%
3. Properties	84%		90%	
4. Miscellaneous	55%		62%	
5. Number Theory	28%		23%	
6. Measurement	21%		29%	
7. Non-Metric Geometry	41%		40%	
8. Numeration System	34%		41%	
9. Percent	52%		65%	
10. Sets	67%		70%	
11. Statistics	44%		56%	
12. Probability	9%		11%	
13. Functions and Graphs	2%		13%	
14. Trigonometry	12%		5%	
15. Problem Solving	Integers 80%	Fractions 5%	Integers 89%	Fractions 4%
Aggregate (Median %)	44%		56%	

*Median percent for the category.

NAME ▶ TRADITIONAL VS. CONTINUOUS PROGRESS GRADE ▶ 6

SCHOOL ▶ Monnig and Wedgwood

CITY ▶ DATE OF TESTING ▶

XX/XX

T CP

PRESCRIPTIVE MATHEMATICS INVENTORY
DIAGNOSTIC MATRIX
PURPLE BOOK

PREOPERATIONAL CONCEPTS

	WHOLE NUMBERS +	WHOLE NUMBERS −	WHOLE NUMBERS ×	WHOLE NUMBERS ÷	POSITIVE FRACTIONS +	POSITIVE FRACTIONS ×	POSITIVE FRACTIONS ÷	DECIMAL NUMBERS +	DECIMAL NUMBERS ×	DECIMAL NUMBERS ÷	NEGATIVE INTEGERS +	NEGATIVE INTEGERS −	NEGATIVE INTEGERS ×	NEGATIVE INTEGERS ÷
PICTORIAL FRACTIONS (1)	62/70													
EQUIVALENCE FRACTIONS (3)	56/71													
EQUIVALENCE DECIMALS (4)	12/34													
LOWEST (SIMPLEST) TERMS (5)	27/46													
LOWEST COMMON DENOMINATOR (6)	38/57													
NUMBER LINE (NEG. INTEGER) (9)	87/67													

NUMBER THEORY

	WHOLE NUMBERS +	WHOLE NUMBERS −	WHOLE NUMBERS ×	WHOLE NUMBERS ÷
PRIME NUMBERS (188)	29/46			
PRIME FACTORIZATION (189)	7/13			
COMPOSITE NUMBERS (190)	10/55			
EVEN AND ODD NUMBERS (197)	84/88			
COMMON FACTORS (196)	94/52			

ADDITION

UNLIKE (48)	24/47	TENTHS (73)	88/85	1-DIGIT (101)	57/51		
MIXED (50)	25/46	HUNDREDTHS (74)	84/80				
		THOUSANDTHS (75)	78/73				
COLUMN (10) 85/31	LIKE (61)	48/61	TENTHS (76)	23/30			
	UNLIKE (62)	23/51	HUNDREDTHS (77)	73/77			
	MIXED (53)	22/46	THOUSANDTHS (78)	76/79			

SUBTRACTION

	LIKE (54)	65/69	TENTHS (79)	93/89	2-DIGIT (103)	16/9	
	UNLIKE (55)	25/45	HUNDREDTHS (80)	83/81			
	MIXED (56)	17/45					
4-DIGIT (21) 71/80	LIKE (57)	17/39	TENTHS (81)	58/69			
5-DIGIT (22) 80/84	MIXED (58)	12/37	HUNDREDTHS (82)	50/63			
			THOUSANDTHS (83)	64/64			

MEASUREMENT

NONSTANDARD UNITS (201)	52/55
ANGLE (202)	82/72
PERIMETER (204)	7/34
AREA (207)	43/59
VOLUME (210)	29/36
CIRCUMFERENCE (213)	9/10
GRAPHS (214)	72/73
LINEAR MEASURE (220, 221, 224)	70/76 53/49 52
TEMPERATURE (225)	78/86
MONEY (229, 230)	76/85 40/50
LIQUID (231, 232, 233)	54/76 53/70 59/58
WEIGHT (234, 235, 236)	30/75 21/44 47/58
CLOCK (237, 238, 239)	46/80 27/82 34/54
CALENDAR (241)	88/91

MULTIPLICATION

1-DIGIT × 4-DIGIT (28) 73/85	PROPER × PROPER (60) 53/65	TENTHS × WHOLE (84)	57/56
2-DIGIT × 2-DIGIT (30) 80/84	WHOLE × PROPER (61) 54/66	HUNDREDTHS × WHOLE (85)	63/47
2-DIGIT × 3-DIGIT (31) 55/64	WHOLE × MIXED (62) 23/46	THOUSANDTHS × WHOLE (86)	52/53
3-DIGIT × 3-DIGIT (32) 54/67	PROPER × MIXED (63) 8/42	TENTHS × TENTHS (87)	63/63
3-DIGIT × 4-DIGIT (33) 52/64	MIXED × MIXED (64) 7/28	HUNDREDTHS × HUNDREDTHS (88)	44/36
EXPONENTIAL NOTATION (5) 45/44		THOUSANDTHS × THOUSANDTHS (89)	41/33
		HUNDREDTHS × THOUSANDTHS (90)	47/41
		MIXED × MIXED (91)	38/41

DIVISION

3-DIGIT ÷ 1-DIGIT (41) 79/90	PROPER ÷ PROPER (66) 13/42	TENTHS ÷ TENTHS (92)	75/74
3-DIGIT ÷ 2-DIGIT (42) 65/84	PROPER ÷ WHOLE (67) 15/44	HUNDREDTHS ÷ HUNDREDTHS (93)	63/67
4-DIGIT ÷ 1-DIGIT (43) 64/65	WHOLE ÷ MIXED (68) 16/44	TENTHS ÷ TENTHS (94)	20/25
4-DIGIT ÷ 2-DIGIT (44) 71/79	MIXED ÷ MIXED (69) 8/45	TENTHS ÷ WHOLE (95)	25/26
5-DIGIT ÷ 2-DIGIT (45) 63/72	MIXED ÷ WHOLE (70) 10/50	HUNDREDTHS ÷ WHOLE (96)	59/57
	PROPER ÷ MIXED (70) 9/48	THOUSANDTHS ÷ WHOLE (97)	38/28
	MIXED ÷ PROPER (71) 6/40	WHOLE ÷ TENTHS (98)	6/22
	MIXED ÷ MIXED (72) 4/27	MIXED ÷ MIXED (99)	27/30

PROPERTIES

COMMUTATIVE (127, 128)	71/59	61/41
ASSOCIATIVE (134, 135)	57/41	56/40
DISTRIBUTIVE (146)	64/57	64/53
IDENTITY ELEMENT (145, 148)	63/56	23/20
INVERSE RELATION (152, 153)	37/30	41/35

NON-METRIC GEOMETRY

POINTS (242)	5/7
LINE SEGMENTS (244)	25/51
REGIONS (245)	72/71
PARALLEL LINES (247)	73/75
PERPENDICULAR LINES (248)	25/27
RAY (250)	49/61
ACUTE ANGLE (251)	33/56
OBTUSE ANGLE (252)	28/32
RIGHT TRIANGLE (255)	14/33
SCALENE TRIANGLE (257)	16/23
QUADRILATERAL (259)	40/46
PARALLELOGRAM (260)	41/44
INTERSECTION (264)	0/1
PYRAMID (266)	56/65
POLYHEDRON EDGES (268)	39/47
POLYHEDRON FACES (269)	32/40
POLYHEDRON BASES (270)	13/14
POLYHEDRON VERTICES (271)	13/17
RATIO AND PROPORTION (272)	51/18
SYMMETRY (274)	36/40
MAP READING SCALE DRAWING (276)	51/73
CARTESIAN (COORDINATE) PLANE (283)	51/58

SETS

UNION (305)	34/41
INTERSECTION (306)	60/69

STATISTICS

MEAN (320)	13/45
RANGE (323)	4/11

PERCENT

DENOMINATOR OF 100 (309)	46/47
EQUIVALENT RATIOS (310)	21/39
% BETWEEN 0 AND 100 (311)	13/19
% LESS THAN 1 (308)	46/30
% GREATER THAN 100 (309)	29/23

NUMERATION SYSTEMS

(100) – (99 99) (285)	28/38
(10) – (99 99) (286)	28/36
(2) – (99 99) (287)	15/23
(2) – (9999) (288)	15/22
(BASE) – (BASE) (289)	29/46
(BASE) – (BASE) (290)	56/44
(BASE) – (BASE) (291)	35/30
(BASE) – (BASE) (294)	39/32

PROBLEM SOLVING

MULT. DIV. WHOLE NOS. (337)	39/57
ADD. SUBT. FRACTIONS (338)	26/48
MULT. DIV. FRACTIONS (339)	33/52
ADD. SUBT. DECIMALS (341)	21/41
MULT. DIV. DECIMALS (342)	12/28
PATTERN RECOGNITION (344)	52/60
PERCENT (348)	4/14
PROBABILITY (324)	4/2
PRIMES AND FACTORS (346)	48/69
MULTIPLES (347)	3/9
MONEY AREA (348)	19/30
METRIC SYSTEM (349)	16/33
GEOMETRY (350)	17/23
SET INTERSECTION (351)	63/76

ROUNDED NUMBERS (100, 101, 102)

37/60

NUMBER SEQUENCES (46, 47)

38/58 40/59

MISSING ADDENDS AND FACTORS (72, 73, 74, 75)

42/47 50/69

INEQUALITIES (107)

81/91 84/92 63/60 21/29

49/62

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EXHIBIT A

NAME ▶ TRADITIONAL VS. CONTINUOUS PROGRESS GRADE ▶ 7

SCHOOL ▶ Monnig & Wedgwood

CITY ▶ DATE OF TESTING ▶

T/CP

PRESCRIPTIVE MATHEMATICS INVENTORY

DIAGNOSTIC MATRIX

LEVEL C

		POSITIVE INTEGERS +	POSITIVE INTEGERS ×	POSITIVE FRACTIONS +	POSITIVE FRACTIONS −	POSITIVE FRACTIONS ×	NEGATIVE INTEGERS +	NEGATIVE INTEGERS −	NEGATIVE INTEGERS ×	NEGATIVE FRACTIONS +	NEGATIVE FRACTIONS −	NEGATIVE FRACTIONS ×
PREOPERATIONAL CONCEPTS	PICTORIAL FRACTIONS (1)	79/77										
	EQUIVALENCE (FRACTIONS) (3)	62/75										
	LOWEST (SIMPLEST) TERMS (5)	28/62										
	NUMBER LINE (MIXED NUMBER) (8)	49/63										
	NUMBER LINE (NEG. INTEGER) (9 100 102 105)	35/70					22/58	21/49	24/66			
OPERATIONS	INTEGERS (15 22 33 45 101 104 106 107)	78/85	74/76	42/53	55/64		38/56	2/80	11/45	38/60		
	LIKE FRACTIONS (+ −) (47 57 108 109)			74/92	16/48					24/64	4/37	
	UNLIKE FRACTIONS (+ −) (52 58 110 111)			24/68	27/68					1/42	2/36	
	MIXED NUMBERS (+ −) (53 59 112 113)			39/64	14/43					2/34	2/27	
	PROPER (× ÷) PROPER (60 65 114 115)				55/65	12/51					23/54	1/25
	WHOLE (× ÷) PROPER (61 66 116 117)				34/66	18/60					2/37	4/37
	WHOLE (× ÷) MIXED (62 68 118 119)				18/46	13/51					2/38	1/26
	PROPER (× ÷) MIXED (63 70 120 121)				23/50	12/50					2/30	2/29
	MIXED (× ÷) MIXED (64 72 122 123)				9/42	12/47					2/28	1/21
	DECIMALS (78 83 91 99)			75/81	52/74	26/40	24/52					
PROPERTIES	COMMUTATIVE (126 127 128 129 130)	75/87					42/74	27/66	37/76	45/76		
	ASSOCIATIVE (133 134 135 136 137)	78/88					31/70	39/70	43/67	57/75		
	DISTRIBUTIVE (139 140 141)	62/79					46/80	46/80	48/78	40/71		
	IDENTITY ELEMENT (144 145 146 147 148)	90/75					67/73	15/45	42/76	12/47		
	INVERSE RELATION (151 152 154 155 156)	45/68					18/59	13/41	25/65	8/30		
	CLOSURE (157)	18/36										
	ROUNDED NUMBERS (158 159 160 161 162)	56/66	34/47	45/51	55/67	25/41						
	NUMBER SEQUENCES (168 169 170 171)			79/48	77/86	57/80	30/54	23/60	1/4	8/35		
	TRANSFORM (172 173 174 175 176 177 178 179 180 181)						11/23	13/36	1/9	14/51	21/47	2/54
	INEQUALITIES (187)	23/46										
	EXPONENTIAL NOTATION (35)	5/24										
	ORDER OF OPERATIONS (198)	8/15										
	EXPONENTS (LOGARITHMS) (199)	8/31										
	SIMULTANEOUS EQUATIONS (200)	2/16										
NUMBER THEORY	PRIME NUMBERS (188)	6/1										
	COMPOSITE NUMBERS (190)	11/13										
	RELATIVELY PRIME NUMBERS (191)	3/6										
	EVEN AND ODD NUMBERS (192)	82/87										
	DENSENESS (196)	2/16										
	ABSOLUTE VALUE (197)	5/39										
MEASUREMENT — METRIC QUANTITY	PERIMETER (205)	2/18										
	AREA (208)	0/2										
	VOLUME (211)	0/2										
	VOLUME OF A CONE (212)	0/1										
	ANGLE (203)	23/51										
	METRIC SYSTEM (215)	1/12										
	PRECISION (216)	2/16										
	GREATEST POSSIBLE ERROR (217)	1/12										
	RELATIVE ERROR (218)	0/1										
	24 HOUR CLOCK (240)	22/26										
	SCIENTIFIC NOTATION (220)	0/7										
	SIGNIFICANT DIGITS (219)	22/24										
	INDIRECT MEASUREMENT (221)	15/24										

NON METRIC GEOMETRY	
POINTS (242)	20/10
LINE SEGMENT (243)	56/60
REGIONS (245)	63/66
PARALLEL LINES (246)	78/80
RAY (249)	43/57
BISECTING ANGLES (253)	27/26
ANGLE CLASSIFICATION (254)	12/14
ISOSCELES TRIANGLE (256)	45/42
TRIANGLE CLASSIFICATION (258)	5/14
REGULAR POLYGONS (261)	48/64
POLYGON CLASSIFICATION (262)	0/5
INTERSECTION (263)	44/52
PRISMS (265)	9/32
POLYHEDRON (267)	2/9
RATIO AND PROPORTION (273)	9/11
CONGRUENCE (275)	16/21
SIMILARITY (276)	15/18
CYLINDERS, CONES (277)	55/64
CHORDS (278)	22/47
ELLIPSE (279)	11/17
PYTHAGOREAN THEOREM (280)	7/23
MAP READING SCALE DRAWING (281)	43/77
LATITUDE, LONGITUDE (282)	8/21

SETS	
EQUAL AND EQUIVALENT (308)	63/68
SUBSET (309)	1/3
EMPTY (310)	4/18
DISJOINT (311)	21/36
UNION (305)	15/25
INTERSECTION (306)	67/71
CARDINAL NUMBER (312)	88/94
SOLUTION SETS (313)	1/19
VENN DIAGRAMS (314)	77/80
CARTESIAN PRODUCT (307)	86/84

STATISTICS	
TALLY MARKS (315)	48/55
PICTURE GRAPHS (316)	58/66
LINE GRAPHS (317)	47/14
% ON A CIRCLE GRAPH (318)	42/59
CUMULATIVE FREQUENCY GRAPH (319)	36/48
MEAN (320)	31/46
MEDIAN (321)	8/27
MODE (322)	47/24
RANGE (323)	21/15

PROBABILITY	
SIMPLE EVENTS (324)	0/3
COMBINATIONS (325)	13/26
"OR" (326)	0/0
"AND" (327)	2/5

NUMERATION SYSTEMS	
PLACE VALUE TO 999,999,999 (286)	23/36
PLACE VALUE TO 0.99999 (288)	21/31
EXPONENTIAL NOTATION (291)	43/47
NUMBER - NUMERAL (295)	56/43
ABSTRACT SYSTEMS (296)	11/38
DIVISIBILITY RULES (297)	33/54
SQUARE ROOT (298)	2/18

FUNCTIONS AND GRAPHS	
CARTESIAN COORDINATES (283)	40/52
LINEAR FUNCTIONS (329)	0/2
SLOPE, INTERCEPT (329)	0/0
EQUATIONS FROM GRAPHS (330)	0/2

TRIGONOMETRY	
SINE (331)	1/1
COSINE (332)	0/1
TANGENT (333)	1/3
APPLICATIONS (334)	2/12

PERCENT	
DENOMINATOR OF 100 (299)	53/70
EQUIVALENT RATIOS (300)	42/61
PERCENTS BETWEEN 1 AND 100 (301)	34/41
PERCENTS LESS THAN 1 (302)	35/48
PERCENTS GREATER THAN 100 (303)	34/49
APPLICATIONS (304)	2/30

PROBLEM SOLVING	
ADD DIV WHOLE NUMBERS (336)	69/77
FUNDAMENTAL OPERATIONS (340)	3/5

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EXHIBIT B

14

NAME ▶ TRADITIONAL GROUP VS. CONTINDO PROGRAM ▶ EIGHTH GRADERS

SCHOOL ▶ Monnig and Wedgewood TEACHER ▶

CITY ▶ DATE OF TESTING ▶

PRESCRIPTIVE MATHEMATICS INVENTORY

DIAGNOSTIC MATRIX

LEVEL C

xx/xx

T CP

		POSITIVE INTEGERS +	POSITIVE INTEGERS ×	POSITIVE FRACTIONS +	POSITIVE FRACTIONS ×	NEGATIVE INTEGERS +	NEGATIVE INTEGERS ×	NEGATIVE FRACTIONS +	NEGATIVE FRACTIONS ×
PREOPERATIONAL CONCEPTS	PICTORIAL FRACTIONS (1)	73 85							
	EQUIVALENCE (FRACTIONS) (3)	78 84							
	LOWEST (SIMPLEST) TERMS (5)	55 77							
	NUMBER LINE (MIXED NUMBER) (8)	67 79							
	NUMBER LINE (NEG. INTEGER) (9, 100, 102, 105)	94 90				94 78 85 75 79 81			
OPERATIONS	INTEGERS (15, 22, 33, 45, 101, 104, 106, 107)	85 92 80 96 65 62 81		45 82 85 82 56 53 79					
	LIKE FRACTIONS (+) (47, 57, 108, 109)			92 44 56 / 58 69 55 73 / 57 71 70 44				44 71 99 54 / 36 2 80 57 / 34 47 80 40	
	UNLIKE FRACTIONS (+, -) (52, 58, 110, 111)			76 81 77 56 / 67 86 43 69 / 46 54 80 57 / 44 59 82 58 / 89 52 84 57 / 77 85 65 57 65					45 62 84 50 / 98 87 75 53 / 32 43 82 57 / 38 41 80 35 / 22 32 18 34
	MIXED NUMBERS (+, -) (53, 59, 112, 113)								
	PROPER (×, ÷) PROPER (60, 65, 114, 115)								
	WHOLE (×, ÷) PROPER (61, 66, 116, 117)								
	WHOLE (×, ÷) MIXED (62, 68, 118, 119)								
	PROPER (×, ÷) MIXED (63, 70, 120, 121)								
	MIXED (×, ÷) MIXED (64, 72, 122, 123)								
	DECIMALS (78, 83, 91, 99)								
PROPERTIES	COMMUTATIVE (126, 127, 128, 129, 130)	94 95				94 92	85 90	89 93	85 93
	ASSOCIATIVE (133, 134, 135, 136, 137)	96 86				94 92	85 92	92 95	86 80
	DISTRIBUTIVE (139, 140, 141)	88 90				65 82	77 86	86 86	79 86
	IDENTITY ELEMENT (144, 145, 146, 147, 148)	90 82				87 91	86 65	86 89	85 44
	INVERSE RELATION (151, 152, 154, 155, 156)	79 80				94 78	87 56	88 77	86 57
	CLOSURE (157)	54 56							
	ROUNDED NUMBERS (158, 159, 160, 161, 162)	85 75	58 40	76 57		84 80 84	28 59		
	NUMBER SEQUENCES (168, 169, 170, 171)					91 88 86 72 53	59 32 15 77 70	72 94 87 76	57 60 45 26
	TRANSFORM (×, ÷, ÷, ÷, ÷, ÷, ÷, ÷, ÷, ÷, ÷)								
	INEQUALITIES (187)	78 71							
	EXPONENTIAL NOTATION (195)	49 56							
	ORDER OF OPERATIONS (198)	47 53							
	EXPONENTS (LOGARITHMS (199)	55 67							
	SIMULTANEOUS EQUATIONS (200)	40 23							
NUMBER THEORY	PRIME NUMBERS (188)	5 6							
	COMPOSITE NUMBERS (189)	33 16							
	RELATIVELY PRIME NUMBERS (191)	12 6							
	EVEN AND ODD NUMBERS (192)	90 96							
	DENSENESS (189)	82 53							
	ABSOLUTE VALUE (197)	57 69							
MEASUREMENT	PERIMETER (204)	88 82							
	AREA (208)	9 16							
	VOLUME (211)	1 4							
	VOLUME OF A CONE (212)	0 5							
	ANGLE (208)	67 76							
	METRIC SYSTEM (13)	5 18							
	PRECISION (16)	58 38							
	GREATEST POSSIBLE ERROR (217)	21 [illegible]							
	[illegible]	1 [illegible]							
	[illegible]	9 24							
	SCIENTIFIC NOTATION (220)	6 8							
	[illegible]	38 39							
	NOMENCLATURE (221)	35 38							

NON METRIC GEOMETRY	
POINTS (242)	1 12
LINE SEGMENT (243)	82 74
RAYS (249)	82 76
PARALLEL LINES (246)	86 85
RAY (249)	67 71
BISECTING ANGLES (253)	46 53
ANGLE CLASSIFICATION (254)	44 27
ISOSCELES TRIANGLE (256)	46 39
TRIANGLE CLASSIFICATION (258)	19 15
REGULAR POLYGONS (261)	74 79
POLYGON CLASSIFICATION (262)	1 2
INTERSECTION (263)	65 63
PRISMS (265)	53 44
POLYHEDRON (267)	16 12
RATIO AND PROPORTION (273)	9 18
CONGRUENCE (275)	54 36
SIMILARITY (276)	37 37
CYLINDERS CONES (277)	76 77
CHORDS (278)	59 56
ELLIPSE (279)	0 32
PYTHAGOREAN THEOREM (280)	40 40
MAP READING, SCALE DRAWING (281)	35 59
LATITUDE LONGITUDE (282)	55 26

SETS	
EQUAL AND EQUIVALENT (308)	35 80
SUBSET (309)	0 5
EMPTY (310)	22 29
DISJOINT (311)	45 47
UNION (305)	85 60
INTERSECTION (306)	25 80
CARDINAL NUMBER (312)	59 95
SOLUTION SETS (313)	57 49
VENN DIAGRAMS (314)	49 87
CARTESIAN PRODUCT (307)	55 83

STATISTICS	
TALLY MARKS (315)	62 69
PICTURE GRAPHS (318)	70 76
LINE GRAPHS (317)	17 26
% ON A CIRCLE GRAPH (319)	46 75
CUMULATIVE FREQUENCY GRAPH (320)	55 74
MEAN (320)	46 58
MEDIAN (321)	46 58
MODE (322)	76 82
RANGE (323)	78 82

PROBABILITY	
SIMPLE EVENTS (324)	4 6
COMBINATIONS (325)	40 55
OR (326)	0 0
AND (327)	18 15

NUMERATION SYSTEMS	
PLACE VALUE TO 999,999,999 (256)	30 41
PLACE VALUE TO 0.99999 (268)	30 38
EXPONENTIAL NOTATION (291)	70 77
NUMBER - NUMERAL (295)	37 35
ABSTRACT SYSTEMS (296)	34 41
DIVISIBILITY RULES (297)	76 77
SQUARE ROOT (298)	9 15

FUNCTIONS AND GRAPHS	
CARTESIAN COORDINATES (283)	65 69
LINEAR FUNCTIONS (328)	2 22
SLOPE INTERCEPT (329)	1 2
EQUATIONS FROM GRAPHS (330)	0 4

PERCENT	
DENOMINATOR OF 100 (298)	77 89
EQUIVALENT RATIOS (300)	67 79
PERCENTS BETWEEN 1 AND 100 (301)	32 54
PERCENTS LESS THAN 1 (302)	46 59
PERCENTS GREATER THAN 100 (303)	62 68
APPLICATIONS (304)	15 28

TRIGONOMETRY	
SINE (331)	45 5
COSINE (332)	4 4
TANGENT (333)	0 6
APPLICATIONS (334)	15 20

PROBLEM SOLVING	
ALL [illegible]	19 82
[illegible]	5 46

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EXHIBIT C

Sixth Graders' Test Success

Data in Table 4 and Exhibit A reveal a consistently superior test success by sixth grade "continuous progress" students. The test success of these students exceeded that of "traditional" students in fourteen of the fifteen math skill areas. Sixth grade students in "traditional" classes attained greater success only in the skill area designated as Properties. They also performed better on problems involving multiplication and division of decimal fractions.

On the average forty-one percent of the "traditional" students and fifty-two percent of the "continuous progress" students correctly worked each problem. These are indices to the total test success of the two groups of students.

Seventh Graders' Test Success

Data in Table 5 and Exhibit B reveal a consistently superior test success by "continuous progress" students at the seventh grade level.

The test success of "continuous progress" students exceeded that of "traditional" students in fourteen of the fifteen math skill areas. Students in conventional classes attained greater test success only in the skill area designated as Non-Metric Geometry.

On the average problems were worked correctly by approximately twenty-two percent of the "traditional" students and by forty-three percent of the "continuous progress" students.

Eighth Graders' Test Success

Data in Table 6 and Exhibit C reveal a consistently superior test success by "continuous progress" students at the eighth grade level.

The test success of "continuous progress" students exceeded that of "traditional" students in twelve of the fifteen skill areas. Students

in "traditional" classes attained greater success in skill areas designated as Number Theory, Non-Metric Geometry, and Trigonometry.

On the average the problems were correctly worked by approximately forty-four percent of the "traditional" students and by fifty-six percent of the "continuous progress" students.

Test Results and Math Ability

Achievement of groups should not be compared without adjustments for initial differences in math ability. Data in Table 7 and Exhibits D-F reveal that students in "continuous progress" classes had higher proficiencies in mathematics skills in the fall. Allowance for this difference in initial mathematics ability was made statistically (ANCOVARY) by adjusting the actual spring test results. Differences in these adjusted means were then tested statistically for significance. Results are presented in Table 7.

TABLE 7 Prescriptive Math Inventory Test Results at Monnig and Wedgwood Middle Schools

GRADE AND TREATMENT GROUP		N	PRE AND POSTTEST RESULTS		
			Fall Mean G.E. Math Subtest	Spring Actual Mean Raw Score PMI	Spring Adjusted Mean Raw Score PMI
Grade Six	Continuous Progress Students	176	6.77	89.3	84.0
	Traditional Students	102	6.13	71.6	80.9
	Difference		.64*	17.7*	3.1
Grade Seven**	Continuous Progress Students	138	6.65	89.0	81.4
	Traditional Students	97	5.84	51.5	62.3
	Difference		.81*	39.5*	19.1*
Grade Eight	Continuous Progress Students	126	8.58	108.8	104.7
	Traditional Students	78	7.98	95.3	101.9
	Difference		.60*	13.5*	2.8

* Differences are significant at the .05 level of probability or better.
** ITBS scores refer to those obtained when seventh grade students were in the sixth grade.

It may be seen that after adjustments, "continuous progress" sixth graders correctly worked three problems more than their counterparts in "traditional" classes. Seventh grade "continuous progress" students, after adjustments, worked nineteen more problems than their counterparts in "traditional" classes. Eighth grade "continuous progress" students worked nearly three more problems, after adjustments, than their counterparts in "traditional" classes. Only the difference at the seventh grade level was statistically significant ($P = .05$) although differences at all levels favored "continuous progress" students.

The data gathered from testing does not explain the greater difference in results at the seventh grade. "Traditional" students at this level had the problem of converting from a "continuous progress" class in grade six; however, eighth graders had the same problem.

Results are depicted in Exhibits D-F for all mathematics ability levels. The convergence of regression lines for sixth and seventh graders revealed a slight tendency for "traditonal" students with very low initial math ability to score slightly higher on the PMI than their counterparts in "continuous progress" classes (Exhibits D and E). Except for students at the very lowest levels of math ability in grades 6 and 7, "continuous progress" students at all ability levels generally outperformed their counterparts on the PMI. The improved performance by average and above average ability students in "continuous progress" classes was particularly noticeable in grade seven (Exhibit E).

A relatively poor correlation (Traditional = .53; Continuous Progress = .82) between the fall measure of math competence and the

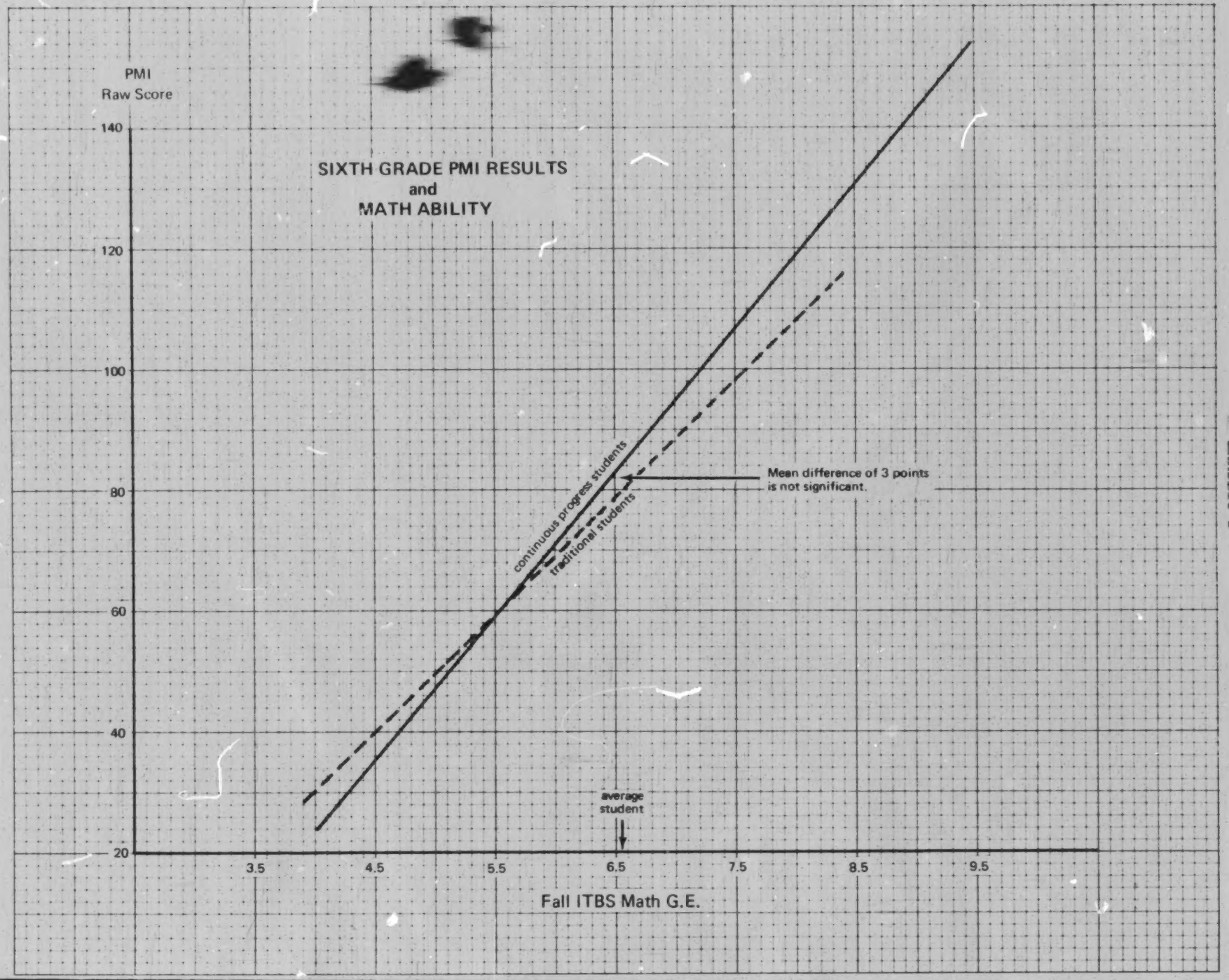
PMI
Raw Score
SIXTH GRADE PMI RESULTS
and
MATH ABILITY
140
120
100
80
60
40
20
continuous progress students
traditional students
Mean difference of 3 points
is not significant.
average
student
3.5
4.5
5.5
6.5
7.5
8.5
9.5
Fall ITBS Math G.E.

EXHIBIT D

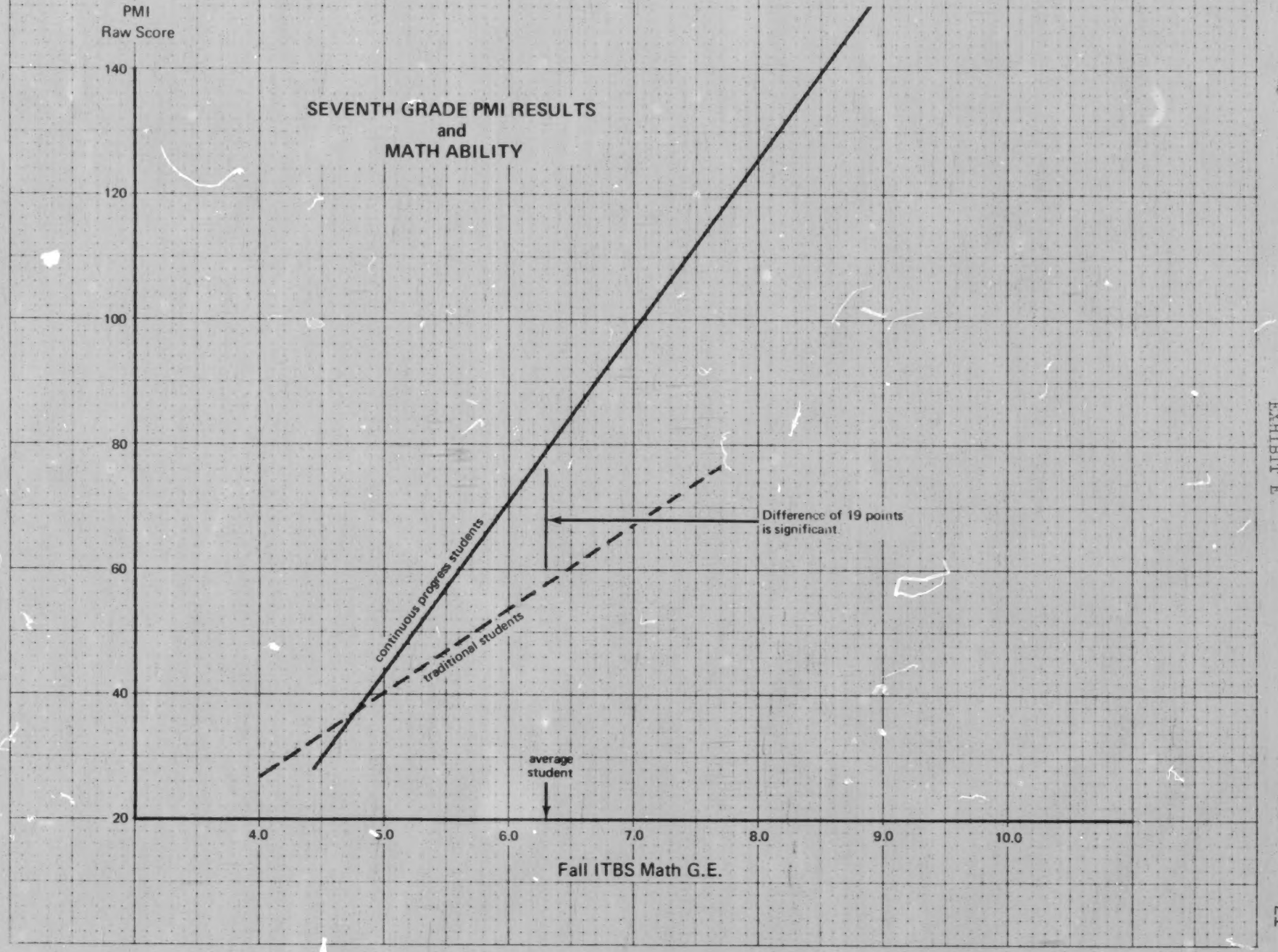
PMI
Raw Score
SEVENTH GRADE PMI RESULTS
and
MATH ABILITY
140
120
100
80
60
40
20
4.0
5.0
6.0
7.0
8.0
9.0
10.0
Fall ITBS Math G.E.
Difference of 19 points
is significant
continuous progress students
traditional students
average
student

EXHIBIT E

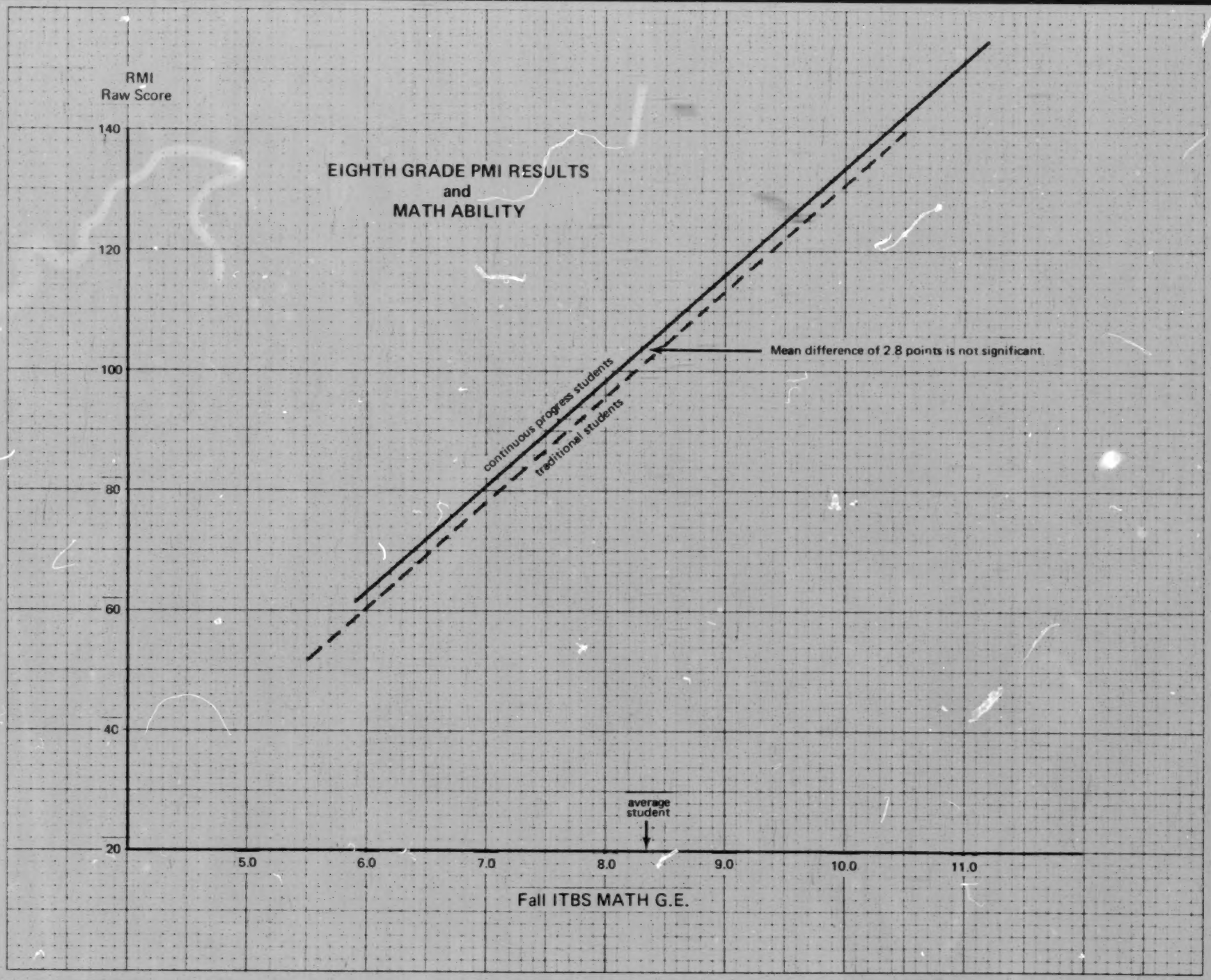
RMI
Raw Score
140
120
100
80
60
40
20
EIGHTH GRADE PMI RESULTS
and
MATH ABILITY
Mean difference of 2.8 points is not significant.
continuous progress students
traditional students
average student
5.0
6.0
7.0
8.0
9.0
10.0
11.0
Fall ITBS MATH G.E.

EXHIBIT F

spring measure of mathematics competence of "traditional" seventh grade students could be interpreted as evidence of a failure to achieve their individual potential. Correlations between fall and spring measures of math competence of students in "continuous progress" classes exceeded those of "traditional" students at all grade levels, usually by .10.

PMI Test Results and Reading Ability

The influence of reading on math competence was determined statistically by 1) examining the PMI results in terms of reading ability and 2) checking PMI results for interaction between reading ability and math ability. Interaction was examined through the use of a two-way analysis of covariance and a three-way analysis of variance design. The NTSU Data Center provided those data analyses.

Reading Ability and PMI Scores

At each grade level, "continuous progress" students, regardless of reading ability, scored better on the math test than students with equal reading ability in "traditional" classes. This result is probably due to the substantial, but not absolute, association of reading and math ability.

Data in Table 8 shows that differences in performances on the CPI after adjustments for reading ability differences were significant for sixth and seventh graders but not for eighth graders. Effects, however, of reading ability of seventh graders on PMI scores differed from those at other grade levels in that reading skill and math progress evidently was less related in "traditional" classes at this particular grade level. The correlation coefficient between reading skill and CPI scores varied around .60 for all treatment groups and grade levels except in this instance when it was depressed to .40. One possible

Table 8. PMI Results and Reading Ability

Group and Grade Level	N	Mean Fall Reading Score ITBS (G.E.)	Mean PMI Score (RS) Actual	Adj.	Correlation
Grade 6					
"Continuous Progress" Students	176	7.16 yrs.	89	86	.64
"Traditional" Students	102	6.63 yrs.	72	77	.63
Difference		.53 yrs.*	17*	9*	
Grade 7					
"Continuous Progress" Students	138	7.0 yrs.	89	84	.69
"Traditional" Students	97	6.3 yrs.	51	57	.40
Difference		.7 yrs.*	38	27	
Grade 8					
"Continuous Progress" Students	126	9.3 yrs.	109	106	.60
"Traditional" Students	78	8.7 yrs.	95	100	.57
Difference		.6 yrs.*	14*	6	

*Significantly different at the .05 level of confidence or better.

conclusion is that students in "continuous progress" classes are more likely to be able to utilize their reading ability to provide extra support for achievement in mathematics.

Interaction of Reading Ability and Math Ability

Reading ability was also assessed in terms of its possible interaction with math ability to produce different rates of progress in math achievement when the two abilities were viewed in combination.

In the first analysis of interaction, a two-way analysis of covariance design was imposed on the sixth grade data with two treatment and two reading ability levels. In each cell, students' PMI scores were adjusted for differences in initial math ability. Low reading ability was defined as scores below the test norm.

Table 9 presents the resulting data.

Table 9 Presentation of Cell Data* in a Two-Way Analysis of Covariance

Treatment	Reading Ability		
	Low	High	Total Group
Continuous Progress	N=44 Math=5.5 PMI=53 Adj. PMI=74	N=131 Math=7.2 PMI=101 Adj. PMI=88	N=175 Math=6.8 PMI=89 Adj. PMI=85
Conventional	N=35 Math=5.5 PMI=54 Adj. PMI=76	N=67 Math=6.5 PMI=81 Adj. PMI=80	N=102 Math=6.1 PMI=72 Adj. PMI=80
Total Groups	N=79 Math=5.5 PMI=54 Adj. PMI=75	N-198 Math=7.0 PMI=94 Adj. PMI=86	N=277 Math=6.5 PMI=83

* Statistical Data available in Appendix

The interaction between reading and treatment to produce differentiated adjusted PMI results was not statistically significant (P=.19). However, adjusted PMI scores in the cells indicate that the trend was for above average reading ability to enhance math progress and below average reading ability to restrict it. Previously, it was shown that students at all math ability levels achieved more in "continuous progress" classes. This finding must be somewhat amended to state that when reading ability is considered in combination with math ability, there is a trend for students with below average reading ability and similar math ability to achieve about the same math progress whether they are assigned to "continuous progress" or "traditional" classes. This finding was generated by sixth grade data alone and represents a trend rather than a significant finding.

A three-way analysis of variance was also applied to the sixth grade data as a final test of main effects and interaction. Statistical data generated by this test is presented in Appendix C. The results of this analysis are consistent with all other results for grade six. Significant differences were revealed in PMI results for math and reading ability groups separately but not by treatment groups. Significant interaction between the three variables - reading ability, math ability, and treatment - was approached (P=.16-.22) but not attained.

Summary of Test Results

Analysis of PMI test results support the following findings:

1. Students in "continuous progress" classes consistently outperformed students in "traditional" classes on the Prescriptive Math Inventory (PMI) after two trimesters (Tables 4, 5, and 6).
2. Differences in PMI results, after adjustments for fall differences in math ability, favored "continuous progress" students at all grade levels. At the seventh grade level this difference was statistically significant. Generally, at all math ability levels students in "continuous progress" classes outperformed their counterparts in "traditional" classes. The advantage of "continuous progress" classes tended to increase as math ability increased. (Exhibits D-F and Table 7)
3. When reading ability and math ability were considered in combination, interactive affects on PMI score, was not significant; however, when math ability was held constant a trend was noted for the math progress of students with above average reading ability to be enhanced in "continuous progress" classes. Conversely that of students with below average reading skills, if math ability were held constant, tended to be restricted in "continuous progress" classes and to result in similar progress regardless of assignment. (Table 9)

FINDINGS ABOUT PROCEDURES

Data reported in this section deals with questions about processes utilized in "continuous progress" classes.

These data were gathered through classroom observations, teacher-opinionnaires, and from local school records.

This section includes information about

1) classroom procedures,
2) teacher opinion about the "continuous progress" plan,
3) problem-solving tasks in packets and textbooks,
4) level-completion by students in 1972-73, and
5) student choices in 1973-74 for "traditional" or "continuous progress" classes.

Classroom Procedures

Two observers gathered data from eighteen classes during the first part of the spring trimester.

Three "continuous progress" classes and three "traditional" classes, one class of each type at each grade level, were observed at each of the three middle schools. The two observers were in each classroom at the same time. One observer used a checklist developed to record the behavior of the teachers and the total class; one observer recorded the behavior of five students selected at random. Neither teachers nor students were aware of the types of behavior being

observed. Data gathered with the use of the checklist are summarized in Appendices D and E.

Teacher Behavior

The data indicate that more group instruction was observed in "traditional" classes than in "continuous progress" classes. Group instruction was of greater duration in the "traditional" type of class, averaging fifteen minutes there in contrast to four minutes in the "continuous progress" classes.

Group instruction in "traditional" classes was usually directed at the total class while in "continuous progress" classes it was always directed at five to six students. Instruction directed to the total class was not observed at any time in "continuous progress" classes, nor was small-group instruction observed in "traditional" classes.

Teachers in "traditional" classes also directed more instructions, in terms of frequency and duration, not related to math tasks (i.e., "go to your seat", "be quiet", etc.) to both the total class and to individuals.

Individual instructions were observed equally in terms of frequency in both settings; however, the duration of the individual instruction provided was much longer in "continous progress" classes (average=5 minutes than in "traditional" classes (average=1 minute). Much of the attention observed in the "traditional" classes was of the 'stop-by-the-desk-to-make-a-comment' type while the individual attention observed in "continuous progress" classes involved more instructions.

Student Behavior

Pupil-pupil interaction was similar in both settings in terms of frequency and duration. For the most part, this interaction was perceived by the observers as task-related.

Data relative to attentiveness supports the conclusion that students in both settings generally applied themselves to their assigned tasks. Disruptive behavior was almost completely unobserved in the eighteen visits to classrooms. When whole-class instructions were given in "traditional" classes, the majority of students were attentive throughout most of the dialogue. In "continuous progress" classes all students were generally attentive during small-group instructions. Tabulation of attentiveness in "continuous progress" classes was somewhat invalidated on occasions when the group was not called together and the observer was not sure which students should have listened.

Observational data relative to student-interest in their tasks were fairly similar in both settings. However, the data implied a low level of interest by both "traditional" and "continuous progress" students.

Classroom observational data in the table show that students rarely volunteered responses when group instruction in either setting were provided, implying that most of the communication was of the

one-way type. These responses were tabulated during small-group instruction in "continuous progress" classes and during total-group instruction in "traditional" classes. Although few students initiated a response to the group instruction in either setting, such a response was perceived by the observer as appropriate about half the time.

Miscellaneous Observations

The number of students in each class varied from 26 to 40 for "traditional" to 23 to 37 in "continuous progress" classes. Class size tended to have an effect on procedures in "continuous progress" classes. Many "continuous progress" classes did not have room to set up a lecture area for those receiving instructions, and the teacher gave instructions from the front of the room to students in certain packets who were scattered throughout the room, possibly disturbing other students in the process.

A major difference between "continuous progress" math classes and the "traditional" math classes was in the number of students receiving instructions from the teacher at one time. In "continuous progress" classes the teacher lectured to small groups, and in "traditional" classes the teacher lectured to the entire class. Student participation was greater in "traditional" classes because there were more students in the group. All students in the "traditional" classes were given the same assignment whereas in "continuous progress" classes, students worked on different levels.

Team teaching "continuous progress" classes, implemented at one school, were not noticeably different from one-teacher "continuous progress" classes. Each teacher considered one-half of the room and students as hers and in most cases large open rooms were divided by bookcases and blackboards. Cooperation between the team teachers was similar to the cooperation between non-team teachers of "continuous progress" classes. An exchange of students on different levels was continuously taking place between teachers in one-teacher "continuous progress" classrooms as well as the teachers in team-teaching "continuous progress" classrooms.

Both "continuous progress" and "traditional" classes were perceived as dull by observers. Students in "continuous progress" classes

particularly were perceived as working methodically through the highly structured curriculum presented them. Observers reported teacher-class two-way dialogue about mathematics was animated and lively in only two of the nine "traditional" classes visited and not in any of the nine "continuous progress" classes.

Conclusions Drawn from Classroom Observation Data

Observations in eighteen classrooms, nine in "traditional" and nine in "continuous progress" generated the following statements about teacher procedures and student responses.

1. Students in "traditional" classes received whole-group instructions in contrast to the "small-group instructions" provided students in "continuous progress" classes.
2. Students in "continuous progress" classes received more individual attention than students in "traditional" classes.
3. Pupil-pupil interaction was similar in both instructional settings and was perceived by observers as relating, for the most part, to math tasks.
4. Students were attentive to instructions and, for the most part, worked independently and with reasonable diligence on their individual tasks in "continuous progress" classes. Student attentiveness to instructions varied considerably in "traditional" classes from teacher to teacher, and in general was not as complete as that observed in "continuous progress" classes. This finding is probably related to #1 above.

5. Teacher-pupil interaction in both settings was teacher-initiated, for the greater part, and elicited meager student response.
6. Disruptive behavior did not constitute a problem in either setting.
7. Students were perceived as working methodically and without inspiration at math tasks in "continuous progress" classes and in most "traditional" classes.

The limitations of classroom observations as a data-collection technique are well known and must be incorporated into an assessment of the findings listed above. The two major limitations are that

1) classroom observations represent only a sample of all class periods, and
2) the observer, by his presence alone, is likely to change the regular behavior of teachers and students.

Teacher Opinion

A semi-structured questionnaire (Appendix F) was mailed to math teachers assigned to the three middle schools. Questionnaires were mailed to teachers' home addresses and returned anonymously to the Research Department. Seventeen questionnaires were returned.

Teachers who taught "continuous progress" classes, for the most part, expressed the opinion that students in their classes

1) made progress commensurate with their ability, and
2) worked independently effectively.

Teachers of "continuous progress" classes reported that they worked with students in small groups, sometimes at their seats and sometimes in special areas. In some cases students were tested at special testing centers or areas. Teachers of "continuous progress" classes reported that both professional and student aides were available to them and were helpful. Teachers of "continuous progress" classes reported that their instructional program was not weighed in favor either of "computational" or "problem solving" but was fairly well balanced in that regard. The chalkboard was reportedly used for individual explanations but rarely, if at all, for group work.

Teachers who taught "regular classes" at some time during the year reported that, for the most part, students progress together through textbook material. A few reported systematic attempts to enrich the curriculum for faster learners.

The two "regular class" teachers using aides did not assess them as being particularly helpful. Regular class teachers, also reported that their instructional program was balanced between computational skills and problem solving skills.

Summary Opinions by Teachers

In a summary assessment the math teachers at the three middle schools expressed the opinion that students should, again in 1973-74, be given a choice between "continuous progress" and "regular" classes. Half of the teachers indicated that they were more comfortable teaching

in "continuous progress" classes and half indicated that they were more comfortable teaching in "regular" classes.

Teachers, for the most part, expressed the opinion that the "continuous progress plan" was superior to the "conventional" class for most students. Teachers indicated a belief that the "continuous progress plan" was particularly beneficial to students with unusually high or unusually low ability in mathematics. A majority of teachers expressed the opinion that students of average ability would benefit from a "regular" class setting. A few teachers expressed the opinion that sixth graders, because of immaturity, might not benefit as much as older students from "continuous progress" classes.

Problem Solving in Textbooks and Packets

One of the concerns developed as a result of informal conversations with teachers and observation of students in "continuous progress" classrooms was the possibility that the "continuous progress" plan might have the effect of focusing unduly on computational skills. As a partial response to that concern, students' packets were examined to determine the frequency of computational and problem solving tasks. The textbooks used in "regular" classes were also examined. This assessment was made for the Research Department by an experienced middle school math teacher. The examiner made a count of the tasks calling for "problem solving", "computational", or "concept" skills in both the packets and the textbooks.

Data in Table 10 reveal the proportion of activities in both textbooks and packets that was perceived by the examiners as requiring 1) computational, 2) concept and/or 3) problem solving skills. The frequency of each type of task in each packet and in each textbook unit is shown in Appendix G.

Table 10 A Summary of Computational, Concept, and Problem Solving Tasks in Packets and Textbooks

Material and Instructional Plan	Frequency and Proportion of Total Tasks						
	Computation Tasks		Concept Tasks		Problem Solving Tasks		Total Tasks
	f	%	f	%	f	%	
"Continuous Progress" Packets							
Level 1-6 Grade 6	1,524	89%	99	6%	81	5%	1,704
Level 7-13 Grade 7	865	70%	172	14%	197	16%	1,234
Level 14-22 Grade 8	1,000	80%	152	12%	100	8%	1,252
Total	3,389	81%	423	10%	378	9%	4,190
"Traditional" Class Textbooks*							
Grade 6	4,915	87%	430	8%	305	5%	5,650
Grade 7	5,125	81%	600	10%	585	9%	6,310
Grade 8	5,010	82%	609	10%	514	8%	6,133
Total	15,050	83%	1,639	9%	1,404	8%	18,093

*Grade 6 - Singer-Random House; Grade 7, 8 - Addison-Wesley.

The data in Table 10 indicate that the proportions of the three types of tasks are quite similar in "continuous progress" packets and in "traditional" class textbooks. At all three grades students in "continuous progress" classes were confronted with tasks of which about nine percent were concerned with problem solving. In "traditional" textbooks eight percent of the tasks are of the problem solving variety.

The main differences in the content of the two types of materials is in the frequency (in contrast to proportion) of the type of tasks. In "continuous progress" classes only 81 problems to be solved are available during the entire sixth grade for students who complete Levels 1-6 in contrast to 305 application problems in the sixth grade "traditional" textbook. At the seventh and eighth grade "continuous progress" students have 197 and 100 application problems respectively, in contrast to 585 and 514 available in textbooks used by seventh and eight graders in "traditional" classes. Obviously, teachers may cause students in "traditional" classes to focus on different types of problems in textbooks according to personal teaching philosophy.

When proportions of types of problems are examined by grade level, it is noticeable that both packets and texts present a larger proportion of computational tasks at the sixth grade level (5%) than at other levels.

It may also be noted that "traditional" textbooks provide approximately four times more problems of all types than does the packet-text material used in "continuous progress" classes.

Level Completion by Students

Expectation for completion of math levels for students in "continuous progress" classes are described on the "Report to Parents"(Exhibit G).

In order to ascertain the extent to which students were meeting these expectations, the level completed by each student at the three schools was obtained. Results are presented, by grade, in Exhibits H-J, and summarized in Table 11.

Table 11 Summary of Math Level Completion by Students in Three Middle Schools

Students	Expectation*	Percent of Students		
		Didn't Complete Expectation	Completed Expectation	Exceeded Expectation
Grade 6	Complete Levels 1-6	43% (Levels 2-5)	15% (Level 6)	42% (Level 6 or Beyond)
Grade 7	Complete Levels 7-12	58% (Levels 2-11)	7% (Level 12)	35%** (Level 13 or Beyond)
Grade 8	Complete Levels 13-17	80%*** (Levels 2-16)	9%**** (Level 17)	11%**** (Level 18 or Beyond)

* According to "report to Parents", Phase Identification.
** These students may be invited to take Algebra 1-2 in eighth grade.
*** Some may be counseled to take Algebra 1-2 in Grade 9.
**** All will be counseled to take Algebra in Grade 9.

Level Completion by Sixth Graders

Fifty-seven percent of the sixth graders completed Levels 1-6, the expected progress for that grade level or better. Of that fifty-six percent, fifteeen completed sixth grade tasks exactly and forty-two

Report to Parents _____ **Middle School**

Fort Worth Independent School District
Fort Worth, Texas
MATHEMATICS

Student _____ **Phase** 1 2 3 4 5

Home Room _____ **Teacher** _____ 197__-7__

CITIZENSHIP and WORK HABITS

(Check mark in states improvement needed)

	Reporting Periods					
	Fall		Winter		Spring	
	1	2	3	4	5	6
Attends Class						
Participates in Class						
Behaves in Class						
Cares for Personal and School Property						

SUBJECT SKILLS

	ACHIEVEMENT					
	Fall		Winter		Spring	
	1	2	3	4	5	6
Completes Daily Work						
Shows Steps in Written Work						
Checks Answers to Verify Solutions						
Shows Progress by Performance on Tests						

Symbols:
O Outstanding achievement
S Satisfactory achievement
L Limited achievement

Phase 1 Below Grade 6 Work
Phase 2 Grade 6 Work
Phase 3 Grade 7 Work
Phase 4 Grade 8 Work
Phase 5 Above Grade 8 Work

YEARLY AVERAGE

Comments: _____

_____

A THREE YEAR CONTINUUM IN MIDDLE SCHOOL MATHEMATICS

The mathematics continuum is divided into 22 levels. In turn, some levels are divided into concepts. The student has completed each concept which is checked (✓).

1 Number & Numeration
- ☐ Decimal System
- ☐ Reading Roman Numerals

2 Natural & Whole Numbers
- ☐ Addition
- ☐ Subtraction
- ☐ Multiplication
- ☐ Division
- ☐ Factors & Multiples

3
- ☐ Measurement: Capacity
- ☐ Weight: Time

4 Non-Negative Rationals (Fractions)
- ☐ Multiplication
- ☐ Division
- ☐ Properties of Operations
- ☐ Stated Problems

5 Geometry
- ☐ Subsets of the Line
- ☐ Linear Measure
- ☐ Perimeter and Area

6 Non-Negative Rational Numbers (Fractions)
- ☐ Addition
- ☐ Subtraction
- ☐ Properties of Operations
- ☐ Stated Problems

7 Non-Negative Rational Numbers (Decimals)
- ☐ Addition & Subtraction
- ☐ Multiplication
- ☐ Division
- ☐ Properties of Operations
- ☐ Ratio & Proportion
- ☐ Per Cent

8 Geometry
- ☐ Angles & Angle Measurement
- ☐ Plane & Space Figures
- ☐ Perimeter, Circumference & Area

9 Metric System of Measurement
- ☐ Conversions in the Metric System
- ☐ Operations in the Metric System

10 ☐ Consumer Topics

11 Real Numbers (Positive & Negative)
- ☐ Operations with Integers
- ☐ Properties of Operations

12 Statistics
- ☐ Data Tables
- ☐ Statistical Graphs
- ☐ Median, Mode, Mean

13 Real Numbers (Positive & Negative Fractions)
- ☐ Operations with Negative Rational Numbers
- ☐ Properties of Operations
- ☐ Square Roots

14 Sets
- ☐ Union
- ☐ Intersection
- ☐ Properties of Operations

15 Geometry
- ☐ Adjacent & Vertical Angles
- ☐ Perpendicular & Parallel Lines
- ☐ Constructions
- ☐ Perimeter & Circumference
- ☐ Area
- ☐ Volume

16 Number & Numeration
- ☐ Conversions from Base 10 to Other Bases and Vice Versa
- ☐ Operations in Bases 2, 5, 8, 12

17 Measurement
- ☐ Temperature
- ☐ Precision & Accuracy
- ☐ Scientific Notation
- ☐ Conversion from Metric to English Units and Vice Versa

18 Algebra
- ☐ Open Sentences
- ☐ Solving Linear Equalities & Inequalities
- ☐ Stated Problems

19 Geometry
- ☐ Congruence of Triangles
- ☐ Pythagorean Property
- ☐ Special Right Triangles

20 Algebra
- ☐ Relations & Simple Functions
- ☐ Solving Simultaneous Linear Equations
- ☐ Pairs of Linear Inequalities

21 Probability
- ☐ Sample Space
- ☐ Probability of Mutually Exclusive Events
- ☐ Probability of Events Which Are Not Mutually Exclusive
- ☐ Empirical Probability

22 Trigonometric Functions
- ☐ Sine, Cosine, Tangent
- ☐ Stated Problems

HIGH SCHOOL MATHEMATICS
- ☐ Algebra 1
- ☐ Algebra 2

STUDENT PROGRESS CHART

Phase 1 Elementary Continuum
Phase 2 Levels 1 6
Phase 3 Levels 7 12
Phase 4 Levels 13 22
Phase 5 High School Continuum

All students should try to complete Level 22 by the end of Grade 8. Accelerated students who are working between Levels 13 and 22 by the end of Grade 7 may be invited to take Algebra 1 2 in Grade 8. Students who complete at least Level 17 by the end of Grade 8 will be counseled to take Algebra 1 2 in Grade 9. Students who are working between Levels 11 and 16 will be counseled individually to take either Introduction to Algebra or Algebra in Grade 9. Students working below level 11 will be counseled to take Fundamentals of Mathematics in Grade 9.

EXHIBIT G

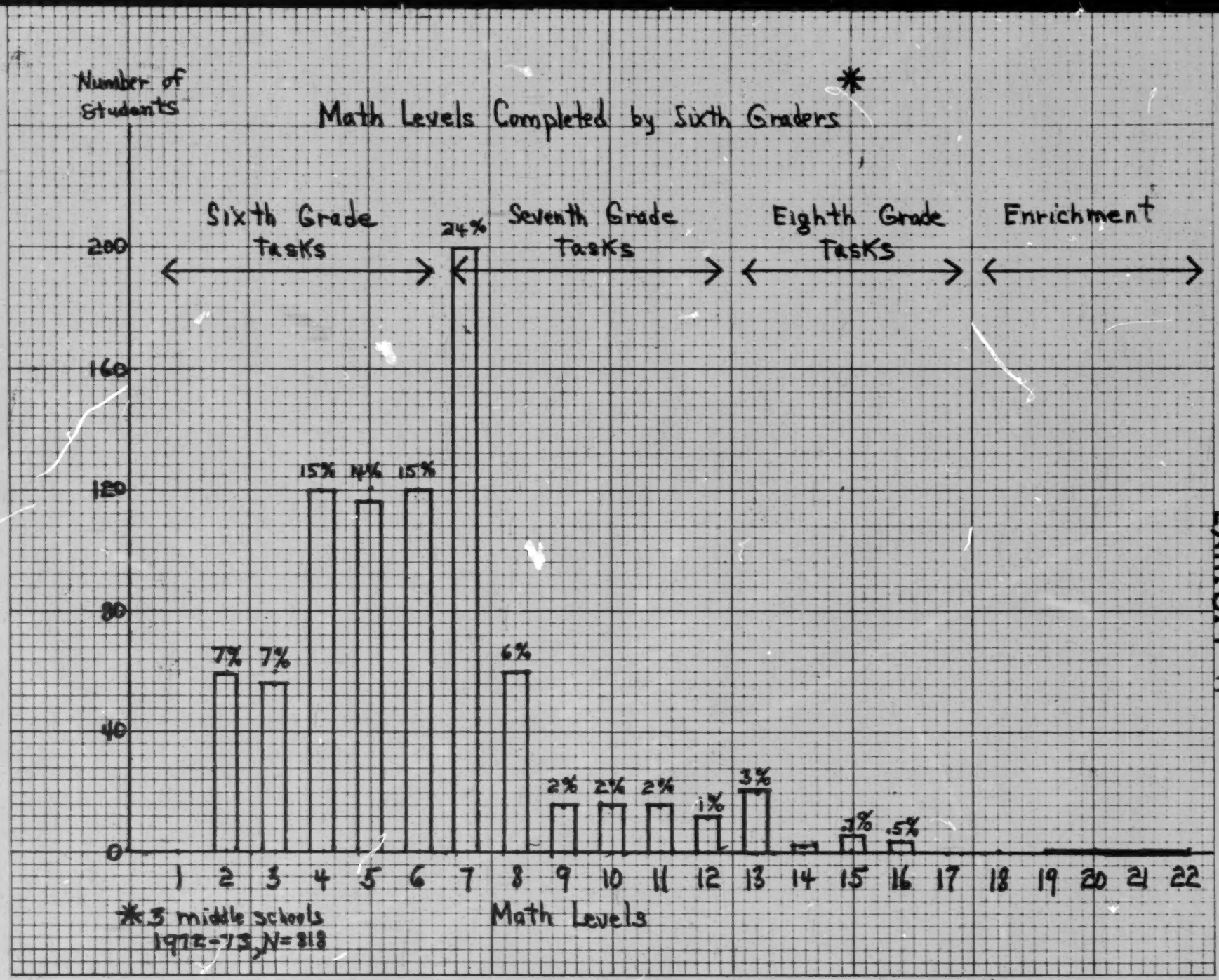
Number of Students
Math Levels Completed by Sixth Graders *
Sixth Grade Tasks
Seventh Grade Tasks
Eighth Grade Tasks
Enrichment
200
160
120
80
40
0
24%
15%
14%
15%
7%
7%
6%
2%
2%
2%
1%
3%
.1%
.5%
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22
Math Levels
*3 middle schools
1972-73, N=818

EXHIBIT H

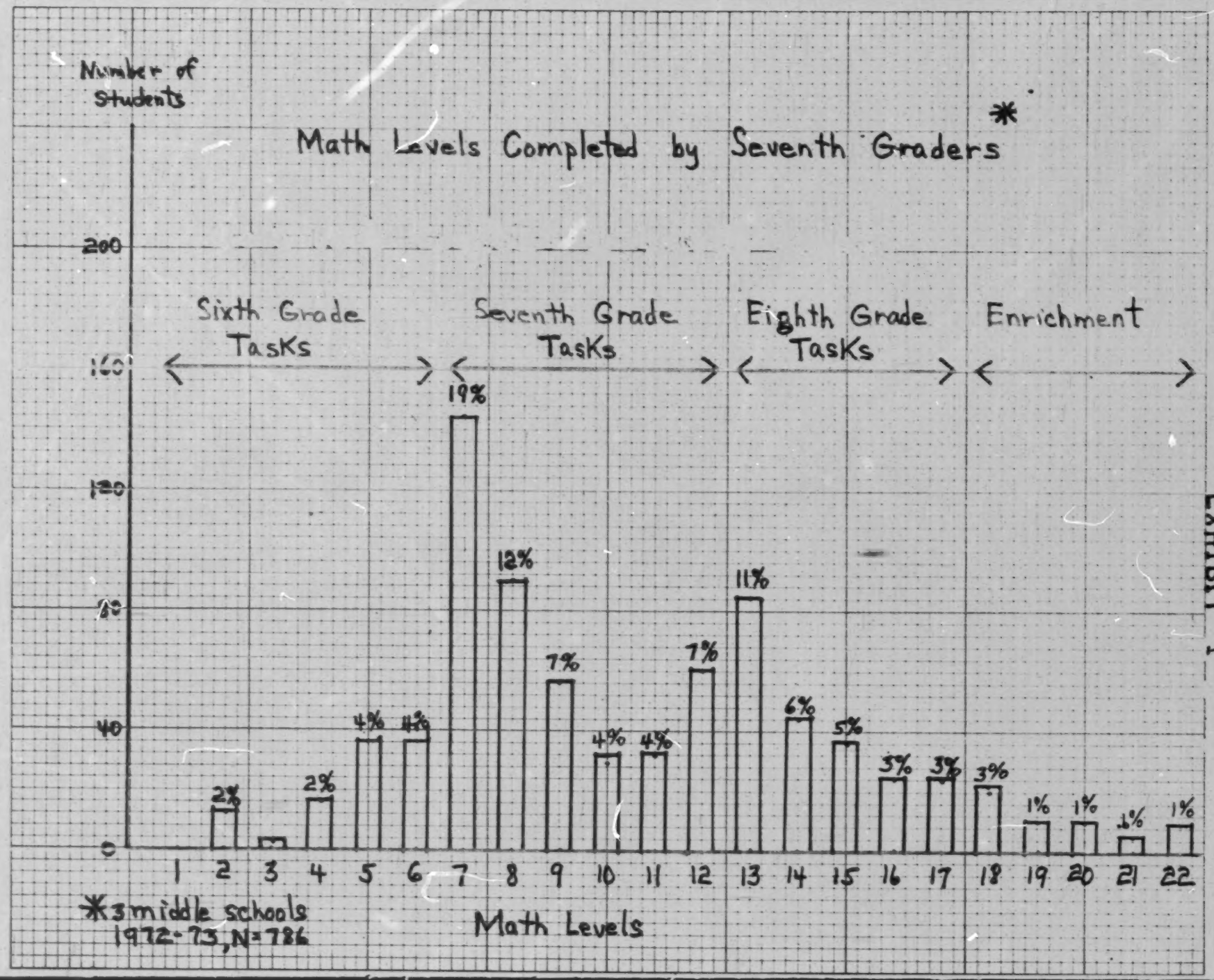
Number of Students
Math Levels Completed by Seventh Graders *
200
160
120
80
40
0
Sixth Grade Tasks
Seventh Grade Tasks
Eighth Grade Tasks
Enrichment
2%
2%
4%
4%
19%
12%
7%
4%
4%
7%
11%
6%
5%
3%
3%
3%
1%
1%
1%
1%
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22
* 3 middle schools 1972-73, N=786
Math Levels

EXHIBIT 1

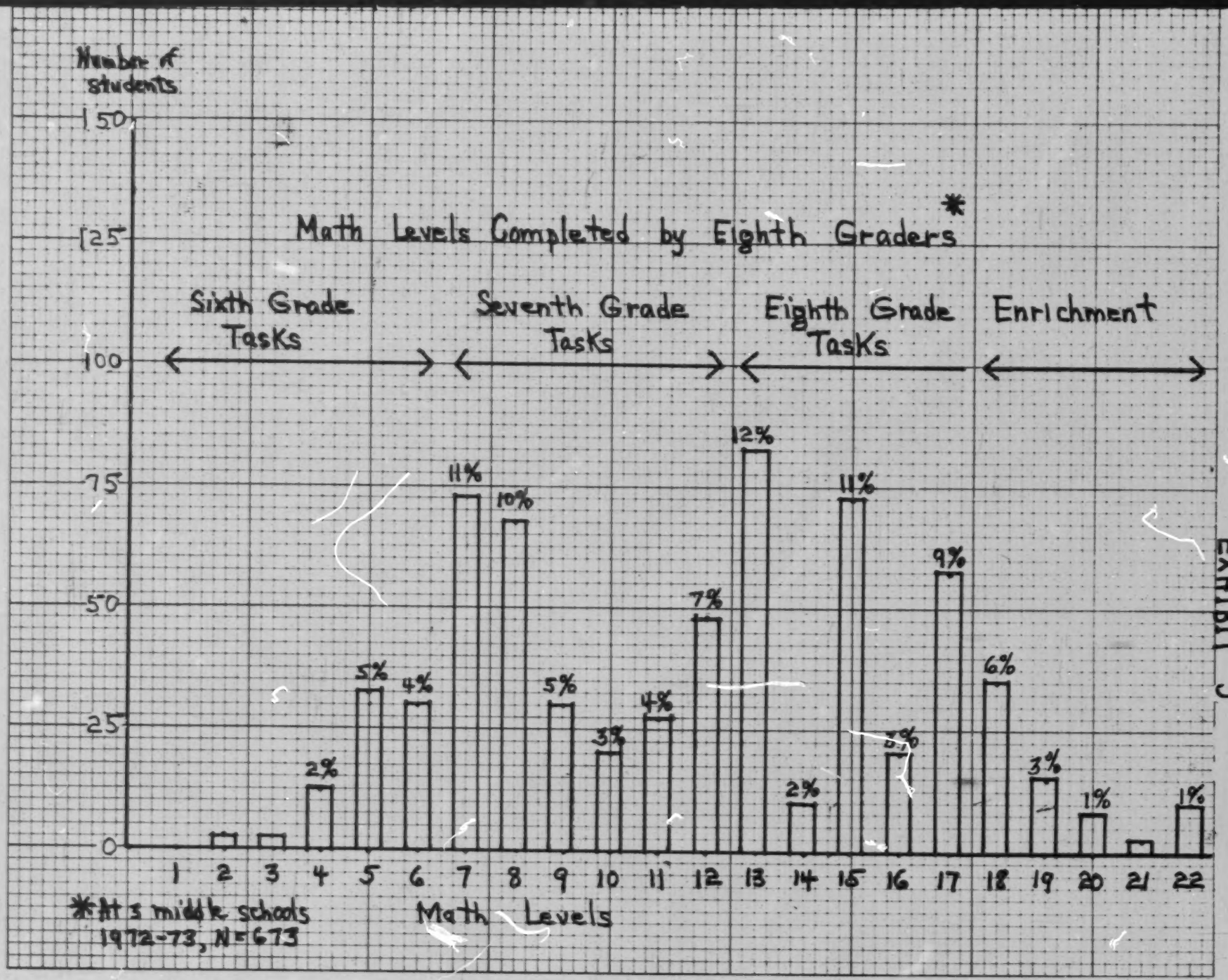
Number of students
150
125
100
75
50
25
0
Math Levels Completed by Eighth Graders*
Sixth Grade Tasks
Seventh Grade Tasks
Eighth Grade Tasks
Enrichment
2%
5%
4%
11%
10%
5%
3%
4%
7%
12%
2%
11%
3%
9%
6%
3%
1%
1%
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22
Math Levels
*11 middle schools 1972-73, N=673

EXHIBIT J

percent completed more than Levels 1-6: six percent completed grade seven expectations. Forty-three percent of the sixth graders did not complete the expectation (Levels 1-6) for that grade level.

Level Completion by Seventh Graders

Exhibit I depicts both the number of proportion of seventh graders completing each level.

Forty-two percent of the seventh graders completed seventh grade expectations (through Level 12) or better. Of this group, seven percent completed grade seven expectations exactly while thirty-five percent exceeded expectations for seventh graders. Ten percent of those students completed Level 17 or better, thereby qualifying for algebra in grade eight (others may be invited on an individual basis).

Fifty-eight percent of the seventh graders did not complete the expectation for that grade (Level 12). A large number of students seemed to have stalled on Level 7 (20 percent) and Level 8 (12 percent) which deal with operation with decimal fractions and geometric concepts respectively.

Level Completion of Eighth Graders

Twenty percent of the eighth graders in "continuous progress" classes completed expectations for that grade (Level 17) or better. These students will be counseled to take Algebra 1-2 in grade nine (others may be so counseled on an individual basis). Of these, eleven percent exceeded expectations by completing Level 18 or beyond.

Eighty percent of the eighth graders did not complete the expectation for that grade (Level 17). Of these forty-five percent

did not complete seventh grade expectations (Level 12). Large numbers of students seemed to have stalled on Level 7 (decimal fractions), Level 8 (geometry), Level 13 (negative fractions), and Level 15 (geometry).

Student Choice in 1973-74

The extent to which students, by choice, changed from "traditional" classes to "continuous progress" classes for the 1973-74 school year was examined. Data was gathered for 1972-73 sixth and seventh graders.

Data in Table 12 reveal that nearly one-half (46%) of the "traditional" students chose to change to "continuous progress" classes while 15 percent of the students in "continuous progress" classes chose to change to "traditional" classes.

Somewhat more than one-fourth (27%) of the 1972-73 sixth and seventh graders chose "traditional" classes for 1973-74.

Table 12 Changes in Choices of Students from 1972-73 to 1973-74

	1972-73 Sixth Graders		1972-73 Seventh Graders*		1972-73	
Group	Chose "CP" for 1973-74	Chose "T" for 1973-74	Chose "CP" for 1973-74	Chose "T" for 1973-74	Chose "CP" for 1973-74	Chose "T" for 1973-74
"Continuous Progress" Students	86%	14%	83%	17%	85%	15%
"Traditional" Students	50%	50%	41%	59%	46%	54%

*These figures are based on 33 1/3% samples at two schools.

In comparison, about one-third had chosen "continuous progress" classes for 1972-73. Thus, although the trend was away from "traditional" classes, a substantial portion of students chose that instructional setting for 1973-74.

Evidence was not systematically gathered relative to reasons of students and/or parents' choices for one instruction plan or the other. Brief and informal discussions, however, with local school administrators and a few randomally selected students did provide a few insights into student preference. Administrators indicated that some parents chose "traditional" classes because of 1) their preference for the A, B, C, etc. reporting system or because 2) they believed that low achieving students scheduled to be bused to their school in 1973-74 were likely to be assigned primarily to "continuous progress" classes. Students who chose "traditional" classes named as reasons: 1) the desire to work in and with a group, 2) the advantage of having other students help with homework, 3) the advantage of having definite assignments with deadlines, 4) the conscious need for close supervision, and 5) the belief that they could get more personal help from teachers in "traditional" settings. Students choosing "continuous progress" classes named 1) the desire to work and progress individually and independently as their personal interest and capacity allowed and 2) the advantage of being able to fit homework into their personal and social life. In summation, some students seemed to feel more comfortable in a psychological sense in the "traditional" class in which the tasks were clearly defined, supervision was available to see that work was accomplished, and all members

of the group were working on the same tasks. Other students, choosing "continuous progress" classes, seemed to feel comfortable working independently and ina setting that allowed them some flexibility* in scheduling their work.

*This control is not be confused with the type of flexibility involved in "open education" in which the "openness" refers to student choices about "what to study" and in what sequence, etc.

SUMMARY, IMPLICATIONS, AND RECOMMENDATIONS

Procedures

Data were gathered from three middle schools, in which students had been given a choice of "traditional" or "continuous progress" math classes, for the purpose of comparing the math progress of students under the two instructional settings.

A criterion-referenced test, the Prescriptive Math Inventory, was administered to all students who finished their year's math studies at the end of the winter trimester. Both "traditional" and "continuous progress" classes were observed, and teacher-opinion was gathered through the use of an anonymous opinionnaire.

Summary of Results

Test Results

An analysis of PMI data revealed the following:

1. Students in "continuous progress" classes consistently outperformed students in "traditional" classes on the Prescriptive Math Inventory (PMI) after two trimesters. (Tables 4, 5 and 6)
2. PMI results, after adjustments for fall differences in math ability, also favored "continuous progress" students at all grade levels. At the seventh grade level this difference was statistically significant. Generally, at all math ability levels students in

"continuous progress" classes outperformed students with similar ability in "traditional" classes; however, a slight trend for the "continuous progress" advantage to increase directly with math ability was noted. (Exhibits D-F and Table 7)

3. When reading ability and math ability were considered in combination, interactive effects on PMI scores were not significant; however, when math ability was held constant a trend was noted for the math progress of students with above average reading ability to be enhanced in "continuous progress" classes. Conversely that of students with below average reading skills, if math ability were held constant, tended to be restricted in "continuous progress" classes and to result in similar progress regardless of assignment. (Table 9)

Classroom Procedures

Observations in eighteen classrooms support the following statements about teacher and pupil behavior:

1. Teachers in "traditional" classes provided large-group instructions but not small-group instructions.
2. Teachers in "continuous progress" classes provided small-group instruction and considerably more individual instruction than those in "traditional" classes.
3. Student attentiveness to tasks was perceived by observers as adequate and similar in both instructional settings, varying mainly by teacher rather than by treatment.

4. Teacher-pupil interaction was, for the most part, teacher-initiated and elicited meager student response.
5. Students were judged by observers to be working methodically and without inspiration at math tasks in "continuous progress" classes and in most "traditional" classes.
6. Disruptive behavior was not observed in either setting.

Teacher Opinion

A synthesis of teacher responses and comments revealed the following:

1. Teachers expressed the opinion that the "continuous progress" plan was superior to the "traditional" plan, particularly for students whose math competence was unusually low or unusually high.
2. Teachers expressed the opinion that students should be given the option of studying math under either the "traditional" or "continuous progress" model.
3. Teachers were almost equally divided between those who preferred to teach a "traditional" class and those who preferred to teach a "continuous progress" class.
4. Teachers reported that they maintained a balance between computational skills and application skills in their instructional program.

Miscellaneous Data

1. An examination of the content of packets and textbooks revealed that the quantity of application-type tasks in textbooks used by "traditional" students was substantially greater than that provided in packets.
2. Larger proportions of students chose "continuous progress" classes in 1973-74 than did in 1972-73.

Implications

The PMI test results suggest that the majority of students would receive the greatest benefit from assignment to "continuous progress" classes. These data cannot be interpreted to mean that each and every student would receive the greatest benefit from a "continuous progress" class. Students whose reading or math ability is extremely low might progress as well in "traditional" classes. Some students may feel more psychologically comfortable in "traditional" classes where everyone works together on the same task. The reporting system is also a factor. Many students and their parents may prefer a report that identifies a student's progress in terms of the group rather than one that identifies a student's progress in relationship to his own working level.

The trend for students with poor reading or math skills to be less likely to obtain an advantage in "continuous progress" classes has implication for schools in which the academic achievement of students is considerably less than that at the three middle schools included in the present study. Findings generated by this study in schools serving affluent areas cannot be automatically generalized to schools serving students from non-affluent neighborhoods.

It is acknowledged that seventh and eighth grade students in "traditional" classes had switched from one instructional plan to another and that some regression effects may have been present. A longitudinal study, of course, would provide more valuable data. Conclusions from a one-year study should be held tentatively.

Two concerns about "continuous progress" classes, developed as a result of data gathering efforts in the classrooms. Students and teachers were perceived by observers as taking a methodically, routine, and uninspired approach to the math tasks in "continuous progress" classes. This was a judgmental observation. No systematic effort was mounted to obtain evidence about student enthusiasm for mathematics. Conversations with teachers of "continuous progress" classes revealed that they felt under great pressure to move students along the math continuum and that time did not allow many general classroom discussions about the value of mathematics or other dialogue aimed at developing higher motivational levels. It may be that the highly structured nature of the continuum approach to learning may have mandated, to some extent, that teachers adopt a structured, mechanical approach to teaching. Some instructions in "traditional" classes, by contrast, was perceived by observers as creative.

A second concern about the "continuous progress" plan arose from an examination of packets. This concern dealt with a possible focus (by packets) on the computational, mechanical aspects of math. Children seemed to only rarely engage in solving "real" problems that called for the application of math skills. An examination of the packets and textbooks did reveal that more "application-type" problems were available in "textbook" than in packets. Application-type problems seemed to be particularly scarce in

sixth grade packets. One entire packet, Level 10, is devoted to "real" problems at the seventh grade level. However, it may be seen from the report about level-completion that large proportions of seventh graders did not reach that packet.

The extent to which level-attainment of students was adequate or not is a judgmental one for the instructional division. Expectations, described on the Report to Parents, were developed arbitrarily by the instructional division initially without benefit of baseline data. The present report now provides that data and these data may be used to revise expectations, or revise the criteria for successfully completing levels, if level-expectation in these affluent schools is seen as inadequate by the instructional division. Classroom observation and discussions with teachers indicate that students are presently working on packets with adequate industry and that teachers are presently under considerable pressure to monitor and motivate student progress.

Support for allowing for student option includes: 1) the substantial proportion of students and parents (twenty-five percent) who continue to choose "traditional" classes; 2) the fact that one-half of the teachers expressed preference for it; and 3) the test data that indicated that students with very low reading or math skills would progress as well in "traditional" classes.

Classroom observation and discussion with staff members support several statements related to miscellaneous concerns about "continuous progress" classes previously expressed by parents:

1) Students were encouraged, and in some cases instructed, to take packets home each day.
2) Students had access to and assignments in textbooks.

3) Students were not observed to be waiting for any considerable length of time, either at their desks or in line, to obtain teacher assistance.

4) Student progress through packets was monitored by teachers and deadlines or expectations for completion of packets were developed as needed.

5) Students were formally instructed in small groups systematically by most teachers observed. It would appear that a student would receive this type of instruction at least twice a week; however, observation in one classroom over a period of a week or so would be needed to verify this frequency.

6) Data were not gathered that would reveal whether seventh grade students in "traditional" classes qualified for algebra in the eighth grade.

Recommendations

It is recommended that....

1) the policy of providing an option between "traditional" and "continuous progress" classes for students be continued. One-fourth of the students continue to prefer "traditional" classes, and many may feel more comfortable working with a group rather than independently.

2) the monitoring and assessment of product and process of both instructional models be initiated at schools serving less affluent communities. Findings generated

at schools serving affluent students cannot be generalized to non-affluent areas.

3) instructional math staffs identify the value of class dialogue and assess the effect, if any, of the exclusion of this strategy from "continuous progress" classes.

4) instructional staffs examine the math packets to determine whether or not application tasks are sufficiently interwoven at regular intervals to insure a high level of understanding of the usefulness of mathematics and to properly motivate the study thereof.

5) the criteria for student progress from one level to another be reassessed to assure that students do not unnecessarily prolong their assault on math objectives that are not crucial.

APPENDIX

APPENDIX A

Consultant in Mathematics

Date: December 19, 1972

To: Dr. Charles Evans

From: Radford Gregg, Jr. R. G.

Subject: Choice of Textbook for Grades 6, 7, and 8, Traditional Programs at #156, 159, and 162

The Addison-Wesley Series was chosen for Grades 7 and 8 in the traditional program for the following reasons.

1) The eighth grade book, School Mathematics II, contains a chapter on percent, pages 233-255, while School Mathematics 8 has a cursory treatment of percent, pages 322-326 and page 213. Many of the eighth grade students enrolled in traditional classes had not studied percent.

2) The Addison-Wesley Series in Grade 8 includes a unit, pages 35-71, on operations with integers, while the Houghton-Mifflin Series includes integers in the Grade 7 textbook and provides review in Grade 8. Some of the eighth grade students choosing traditional had no knowledge of the integers before Grade 8.

3) These books were adopted during the school year 1967-68. Individual schools were given the option of choosing one of the books or a combination of the two books. No pattern developed for these choices so far as achievement was concerned. The school which has had the highest achievement in mathematics in Grade 8 as measured by the Iowa Test of Basic Skills chose the Addison-Wesley Series. Since that choice, their achievement has remained the highest in the city.

4) The seventh grade book, School Mathematics I, was chosen to provide continuity in sequence and philosophy in Grades 7 and 8.

5) The Houghton-Mifflin Series in Grade 8 provides some in-depth study of topics in algebra and the metric system of measurement. However, all of the topics in algebra will be studied in Grade 9 by pupils enrolled in either Algebra 1 or Introductory Algebra 1, while the pupils enrolled in Fundamentals of Mathematics 1 have chosen not to study algebra. The metric system of measurement is included in required science courses. Pupils who learn the concepts presented in the Addison-Wesley Series will have no "gaps" in their knowledge of mathematics at the end of Grade 8 and will be adequately prepared to study algebra in Grade 9.

The Singer book, Sets and Numbers 6, was chosen for the Grade 6 traditional classes for the following reasons.

1) Of the three books available, the Singer book and the Holt book are comparable in topics and philosophy. The American book is specifically for low achieving pupils.

page 2 - Dr. Evans

2) Any pupil having completed either the Singer or Holt book would be adequately prepared for School Mathemataics I in Grade 7.

3) The warehouse had enough copies of the Singer book on hand for all pupils who chose the traditional program.

During a meeting on September 12, 1972, the teachers of traditional classes in Grades 6, 7, and 8 were given the suggested time allotments (a copy is attached). These classes are to be instructed as traditional mathematics classes are now taught in the high school and as these classes were taught prior to implementing continuous progress. Pupil progress will be reported as the grades A, B, C, D, and F as described in A Guide to Grade Reporting, 1968.

In my opinion, the Primary Mathematics Inventory, published by CTB, the McGraw-Hill or a similar test would be the best instrument to use in evaluating these programs.

Each group of pupils (C.P. and T.) would have no superficial advantage over the other. This test can be machine scored and desired results obtained.

Please call if you have further questions.

SETS AND NUMBERS 6

September, 1972

The L. W. Singer Company, Inc., Random House

Part	Content, Sequence	Suggested Time Allotment in Days
1	Sets	3
2	Laws of Arithmetic	5
3	Fractions	7
4	Geometry	5
5	Factors and Multiples	5
6	More about Fractions	10
7	Negative Numbers	6
8	Measuring	5
9	Decimals	8
10	Perpendiculars	5
11	Mathematical Sentences	5
12	Using Division	10
13	A Coordinate System	3
14	Using Fractions	10
15	Using Decimals	9
16	Charts and Graphs	3
17	Powers	6
18	Geometry and Sets	3
19	More Measuring	3
20	Graphs and Functions	3
21	Logic	As time permits
22	Symmetry	" " "
23	Probability	" " "
24	Set Diagrams	" " "

SCHOOL MATHEMATICS I — September, 1972

Addison-Wesley Publishing Company

Chapter	Content, Sequence	Suggested Time Allotment in Days
1	Numbers and Numeration Systems	6
2	Whole Number Operations	7
3	Geometry, Unit, Points, Lines, and Planes	6
4	Computing and Solving Problems	10
5	Number Theory	6
6	Geometry, Unit II, Congruent Angles and Triangles	10
7	Fractions and Rational Numbers	6
8	Computing with Rational Numbers	14
9	Geometry, Unit III, Parallel Lines Pythagorean Theorem	6
10	Decimals	14
11	Ratio, Proportion, and Per Cent	12
12	Geometry, Unit IV, Circles	6
13	Integers	5

September, 1972

SCHOOL MATHEMATICS II

Addison-Wesley Publishing Company

Chapter	Content, Sequence	Suggested Time Allotment in Days
1	Whole Numbers	7
2	Integers	10
3	Geometry, Unit I, Points, Lines, Planes	7
4	Number Theory	8
5	Rational Numbers	11
6	Geometry, Unit II, Congruent Angles and Triangles	8
7	Decimals	14
8	Ratio, Proportion, and Per Cent	12
9	Geometry, Unit II, Parallels	8
10	Real Numbers	7
11	Probability and Statistics	7
12	Geometry, Unit IV, Circles, Spheres, Cylinders, and Cones	8
13	Algebra	7

OBSERVATIONAL SCHEDULE

March 19	Monnig			
		Period 1	Coplin	CP 6
		Period 2	McKay	T 6
		Period 4	Dyer	T 7
		Period 5	Tittle	CP 7
March 21	Stripling			
		Period 1	Clark	CP 6
		Period 3	Fester	T 6
	Monnig			
		Period 4	Stephenson	T 8
		Period 5	Davis	CP 8
March 23	Stripling			
		Period 1	Fitzhugh	CP 8
		Period 3	Scott	T 8
		Period 4	Wood	T 7
		Period 5	Elliott	CP 7
March 27	Wedgwood			
		Period 1	Ashmore, Breckenridge	CP 7
		Period 2	Davis	T 7
		Period 3	Gregory, Miller	CP 6
		Period 5	Purifoy	T 6
March 29	Wedgwood			
		Period 1	Scott	T 8
		Period 2	Hughes, Stansberry	CP 8

Three-Way Analysis of Variance Data, Grade Six

Source of Variation	DF	SS	MS	F	P
Between	7	71395.	10199.		
Rows (Treatment)	1	.206	.206	.00	.99
Columns (Math)	1	56500.	56500.	76.5	.00*
Blocks (Reading)	1	10718.	10718.	14.5	.00*
Row-Col	1	270.	270.	.37	.54**
Row-Blk	1	1335.	1335.	1.81	.18**
Col-Blk	1	1437.	1437.	1.95	.16**
R-C-B	1	1131.	1131.	1.53	.22**
Within	270	199361.	738.		
Total	277	270756.	977		

* Main effects only differ significantly for math and reading ability.

** No significant interaction.

FORT WORTH PUBLIC SCHOOLS
Research and Evaluation Department
3210 West Lancaster
FORT WORTH, TEXAS 76107

CHARLES LEE EVANS
Director
G. W. FISHER
Assistant Director
YSLETA BRYANT
Evaluator

Dear Teacher,

As part of this department's effort to examine the "continuous progress plan" at three middle schools we want to obtain your opinion about that instructional innovation. Please respond to the questions and return to the Research Department in the enclosed envelope. Comments are optional.

In order to maintain as much anonymity as possible we do not ask for teacher identification on the opinionnaire. The last portion of this material (to be signed) has the purposes of insuring the return of all opinionnaires.

Charles L. Evans

CLE:ds

Attachments

TEACHER OPINIONNAIRE
Continuous Progress Plan

	CIRCLE ONE		
In what type classroom have you taught this school year?	Traditional	Continuous Progress	Both

Respond to questions CP1 to CP7 only if you taught a Continuous Progress class this school year. Respond only in terms of continuous progress classes.

	CIRCLE ONE	
CP1. To what extent did you feel that CP students, as a group, made progress commensurate with their ability?	Inadequately	Adequately

Comment? _____

_____

CP2. To what extent did you feel that CP students, as a group, worked independently effectively?	Inadequately	Adequately

Comment? _____

_____

CP3. How did you instruct small groups of CP students?	In their assigned seats	Moved them to special seats

Comment? _____

_____

CP4. Where were CP children tested for level advancement?

_____

CP5. Did you have an aide? If "yes",	No	Yes
a) was this a	professional aide	student aide
b) how helpful was the aide?	of little value	fairly helpful / very helpful

Comment? _____

CP6. What generally was the focus of your instructional dialogue with small groups of CP students in terms of "computation" and "problem solving"?

mostly focused on computation	slightly emphasized computation	slightly emphasized problem solving	mostly focused on problem solving

Comment? _____

_____

CP7. To what extent did you have groups of children work at chalkboards?

rarely	occasionally but systematically	often

Comment? _____

_____

Respond to questions T1 to T6 only if you taught a traditional class during the year. Respond only in terms of traditional classes.

T1. Did all students work simultaneously on the same skill or content? No Yes

T2. Did you implement any systematic procedures to provide enrichment opportunities for more able students? No Yes

If "yes", what procedures?

_____

_____

T3. What chapters or units did students cover who finished both trimesters?

_____

T4. Did you have an aide? No Yes

If "yes",

a) was this a professional aide student aide

b) how helpful was the aide?

of little value	fairly helpful	very helpful

Comment? _____

_____

T5. What generally was the focus of your instructional dialogue with small groups of traditional students in terms of "computation" and "problem solving"?

mostly focused on computation | slightly emphasized computation | slightly emphasized problem solving | mostly focused on problem solving

Comment? _____

_____

T6. To what extent did you have groups of children work at chalkboards?

rarely | occasionally but systematically | often

Comment? _____

_____

Summary assessment by all teachers

S1. Should students and parents be given a choice again in 1973-74 between "traditional" and "continuous progress" classes?

No | Yes

Comment? _____

_____

S2. Which type of program is likely to create more student enthusiasm for mathematics?

Traditional | Continuous Progress

Comment? _____

_____

S3. In what type of instructional model are you, as a teacher, more comfortable?

Traditional | Continuous Progress

Comment? _____

_____

S4. In your opinion, what type of classroom or instructional model is the best for ....

practically all students?	Traditional	Continuous Progress
or specifically		
a) high ability students	Traditional	Continuous Progress
b) medium ability students	Traditional	Continuous Progress
c) low ability students	Traditional	Continuous Progress
d) sixth graders	Traditional	Continuous Progress
e) seventh graders	Traditional	Continuous Progress
f) eighth graders	Traditional	Continuous Progress
g) ?	Traditional	Continuous Progress
h.	Traditional	Continuous Progress
i) ?	Traditional	Continuous Progress

Comment? _____

_____

TEAR HERE AND REMAND THIS LOWER PORTION SEPARATELY THROUGH SCHOOL MAIL AFTER MAILING THE OPINIONNAIRE ABOVE THROUGH U. S. MAIL IN ENCLOSED ENVELOPE.

Send to:

Director of Research/Evaluation
Room 30, East Annex
Administration Building

I have responded to the opinionnaire.

_____
(Teacher's Signature)

APPENDIX E

Types of Problems Required for Completion of Middle School Math Packets

Level	Topic	Computation Problems	Concept Problems	Applied Problems
1	Number and Numeration	100	21	0
2	Addition	56	7	7
2A	Subtraction	89	7	5
2B	Multiplication	213	10	6
$2B_2$	Division	193	3	4
2C	Factors and Multiples	160	2	0
3	Measurement	44	0	13
4	Mult.--Non-Negative Rational Numbers	309	0	17
4_2	Div.--Non-Negative Rational Numbers	53	9	11
5	Geometry	74	21	6
6	Add.--Non-Negative Rational Numbers	132	14	8
6_2	Subt.--Non-Negative Rational Numbers	101	5	4
7A	Non-Negative Rational Numbers	82	8	14
$7A_2$	Non-Negative Rational Numbers	86	10	6
7B	Ratio and Proportion	75	0	27
$7B_1$	Ratio and Proportion	75	9	14
8_1	Geometry	20	56	0
8_2	Geometry	28	0	0
9_1	The Metric System	38	9	0
9_2	The Metric System	29	0	2
10	Consumer Mathematics	0	0	64
11_1	Integers	83	6	22
11_2	Integers	89	33	2
12	The World of Statistics	0	0	28
13_1	Real Numbers	195	34	18
13_2	Real Numbers	65	7	0
14	Sets	125	40	3
15_1	Geometry	57	36	0
15_2	Geometry	46	0	11
16	Numbers and Numeration	83	8	0
17	Measurement	284	20	39
18	Algebra	100	22	13
19	Geometry	59	20	9
20	Algebra	86	0	0
21	Probability	76	6	15
22	Trigonometric	84	0	10
	Totals	3389 (80.8%)	423 (10.0%)	378 (9.0%)
	GRAND TOTAL = 4190			

Types of Problems in Textbooks Used by "Regular Class" Sixth Grade Students

Chapter	Topic	Computation Problems	Concept Problems	Applied Problems
1	Sets	248	0	0
2	Laws of Arithmetic	313	39	4
3	Fractions	283	92	19
4	Geometry	101	47	1
5	Factors and Multiples	350	5	14
6	More About Fractions	391	5	43
7	Negative Numbers	247	19	11
8	Measuring	197	0	46
9	Decimals	311	12	7
10	Perpendiculars	48	25	4
11	Mathematical Sentences	164	6	19
12	Using Division	309	0	26
13	A Coordinate System	32	2	3
14	Using Fractions	326	0	20
15	Using Decimals	465	6	36
16	Charts and Graphs	17	0	22
17	Powers	273	18	6
18	Geometry and Sets	123	0	4
19	More Measuring	217	2	11
20	Graphs and Functions	152	4	1
21	Logic	112	5	3
22	Symmetry	45	129	0
23	Probability	90	6	1
24	Set Diagrams	101	8	4
	Glossary at End of Book		115	
	Totals	4915 (86.9%)	430* (7.6%)	305 (5.3%)
	GRAND TOTAL = 5650			

*Does not include the total of 115 (Glossary at end of book).

Types of Problems in Textbooks Used by "Regular Class" Seventh Grade Students

Chapter	Topic	Computation Problems	Concept Problems	Applied Problems
1	Numbers and Numeration	161	47	7
2	Whole Number Operations	612	36	43
3	Geometry	139	113	8
4	Computing and Problem Solving	354	16	158
5	Number Theory	383	22	8
6	Geometry	229	90	8
7	Fractions and Rational Numbers	389	9	26
8	Computing with Rational Numbers	861	24	105
9	Geometry	160	43	11
10	Decimals	695	59	82
11	Ratio-Proportions-Percent	528	11	112
12	Geometry	142	74	12
13	Integers	472	56	5
	Glossary at End of Book		225	
	Totals	5125 (81.2%)	600* (9.5%)	585 (9.2%)
	GRAND TOTAL = 6310			

*Does not include the total of 225 (Glossary at end of book).

Types of Problems in Textbooks Used by "Regular Class" Eighth Grade Students

Chapter	Topic	Computation Problems	Concept Problems	Applied Problems
1	Whole Numbers	497	47	23
2	Integers	660	61	6
3	Geometry	167	55	6
4	Number Theory	462	21	12
5	Rational Numbers	779	49	53
6	Geometry	215	56	7
7	Decimals	607	97	42
8	Ratio-Proportion-Percent	242	20	119
9	Geometry	251	81	22
10	Real Numbers	367	25	8
11	Probability and Statistics	198	21	143
12	Geometry	179	51	28
13	Algebra	386	25	45
	Glossary at End of Book		255	
	Totals	5010 (81.6%)	609* (9.9%)	514 (8.3%)
	GRAND TOTAL = 6133			

*Does not include the total of 255 (Glossary at End of Book).

APPENDIX F

ANCOVARY Data, Reading Ability and CPI Results, Grade Six

Source of Variation	DF	SS_x	SS_y	SS_{xy}	SS_{yx}	$V_{y.x}$	$SD_{y.x}$	F
Among Means	1	1819	20200	6062	5824	5824		
Within Means	275	65128	373141	98864	223066	811	28.48	
Totals	276	66947	393341	104926	228890			7.18*

* Significant at .01 level of confidence

Means and Adjusted Means by Treatment Groups

Treatment Groups	N	Mean Reading Test	Mean CPI	Adjusted Mean CPI	r
Continuous Progress	176	7.16	89	86*	.64
Traditional	102	6.63	72	77*	.63

* Differs significantly at P=.01.

Two-Way Analysis of Covariance Data, Grade Six

Source of Variation	DF	SS	MS	F	P
Rows (Treatment)	1	185	185	.36	.54
Columns (Reading)	1	4133	4133	8.08	.005*
Interaction	1	874	874	1.71	.19
Within	272	139132	511		

* Significant difference in CPI results by reading ability.

Director
Research and Evaluation

DATE: December 14, 1972

TO: Principal and Math Staff, Wedgwood Middle School

FROM: Charles L. Evans CE

SUBJECT: Classroom Procedures

Classroom procedures, as I perceive them, are described below separately for traditional and continuous progress classes. Please critique, make corrections, etc. and return one copy to me.

Procedures in Conventional Classrooms

1. Class is on-grade and self-contained. Teachers generally employ strategies that are a matter of individual preference.
2. Each student has an assigned text: Grade 6--Sets and Numbers; Grade 7, 8--Addison-Wesley.
3. Students have home assignment nearly every day.
4. Students progress through content of textbook together.
5. Report to parents: ABCDF
6. Teachers provide instructions for the total class daily.

Procedures in Continuous Progress Classrooms

1. Students are assigned to sessions by grade level.
2. Each student has an assigned text matching his particular packet.
3. Packets are keyed to the Houghton-Mifflin and Holt, Rinehart, Winston series.
4. Students are instructed to take packets home each night and work at least 20 minutes.
5. Two-room areas are utilized for instructions with traditional furniture and appointments.
6. There is considerable mobility of students between pairs of teachers.

7. Aides perform only mechanical duties, are not used to monitor student progress and, in fact, are not generally present in the instructional areas.

8. Teachers instruct students in groups so that each child is in an instructed group at least every other day: slower children may receive instructions daily.

9. Teachers are teamed in pairs: one pair for each grade level. Each teacher is responsible for one group consisting of several levels. Teachers plan together substantially by pairs but do not actually teach the total group as a team.

10. Teachers monitor student progress with the use of a card file. There is a limit of two weeks for completion of a packet.

11. Report to parents: O, S, L.

General Observations

1. Parents did not know how teachers would be assigned when they made their choices.

2. A teacher's assignment to either plan does not necessarily reflect his or her professional preference or committment.

3. Judging from fall trimester classroom enrollments, the number of students choosing continuous progress is larger than the number choosing traditional (2:1).

CLE:df

Director
Research and Evaluation

DATE: January 2, 1973

TO: Principal and Math Staff, Stripling Middle School

FROM: Charles L. Evans CE

SUBJECT: Classroom Procedures

Please review the notes and statements below to see if your program is accurately defined. Would the team leader please return one copy to me with corrections. Thanks.

Traditional Classes

1. Textbooks: Grades 7-8: Addison Wesley
   Grade 6: Singer

2. Children proceed together through textbook.

3. Home assignments are moderate and are not governed by a single school policy.

4. Teachers are directed to cover material according to a time-sequence provided by the math consultant.

5. Top students from traditional classes may qualify for Algebra in Grade 8.

Continuous Progress Classes

1. Textbook: Grades 7-8: Houghton Mifflin
   Grade 6: Holt, Rinehart, Winston
   (Multiple adoption was used in 1971-72)

2. Students are initially grouped by grade level. As the trimester proceeds, multi-grade grouping develops with classes due to accelerated movement of certain students through levels.

3. Packets used are those originally developed by the Leonard staff, revised by the Stripling, Wedgwood and Monnig staffs during the summer of 1972.

4. Grade level textbooks are assigned to each student.

5. Students set weekly individual goals.

6. Record cards are used to monitor student progress.

7. Teachers provide instructions to individuals or small groups as needed.

General

1. Most teachers are assigned both traditional and continuous progress classes during the year.

2. Algebra is taken all three trimesters by eighth grade students who qualify.

3. Class size does not systematically vary between continuous progress and traditional classes.

CLE:df

Director
Research and Evaluation

DATE: December 14, 1972

TO: Principal and Math Staff, Monnig Middle School

FROM: Charles L. Evans CE

SUBJECT: Organizational Procedures

Statements describing my perception of procedures employed at Monnig in both traditional and continuous progress are listed below. Please critique, make corrections, etc. and return one copy to me. Thanks.

Practices in Traditional Classrooms

1. A textbook is assigned to each student.
   Grade 6--Rinehart-Winston
   Grades 7, 8--Addison-Wesley

2. Classroom instruction generally follows the textbook content.

3. Crossgrade grouping is not used (with a few exceptions)

4. Neither inter nor intra class grouping is utilized.

5. Students work on same objectives at same pace (some enrichment is available in the textbook).

6. It is unlikely that students who remain in traditional classes will qualify for Algebra I in the eighth grade.

7. Homework is common: four out of five days in classes of two teachers. One teacher provides class time during which probably one-half of the students may complete the daily assignment.

8. Teachers of traditional classes are required to cover designated material in the textbook.

Practices in Continuous Progress Classrooms

1. Classes are self-contained.

2. Students proceed at individual rate through packets and are tested on completion of each packet.

3. Students receive supplementary instruction if needed.

4. Packets are keyed to Houghton-Mifflin series.

5. Packets may be modified but are substantially similar to those in use at and developed by Leonard Middle School.

6. Two instructional aides are available to assist continuous progress classes. One aide basically provides clerical and mechanical aid and only occasionally participates in instruction directly through monitoring student work, etc. The other aide primarily administers a testing center.

7. Student aides are also available to support instructions in some continuous progress classes.

8. Students are instructed to take packets home and work an average of twenty to thirty minutes a day.

9. Formal team teaching is not present: team planning is practiced.

10. Routinely students move from one class to another due to progress through the continuum.

11. A textbook is assigned to each student, depending on the packet on which he is working.

12. Teachers have individually developed methods of monitoring student progress (i.e., two teachers set a Friday deadline for packet completion).

13. Students are <u>regularly</u> given group instruction as well as individual instruction.

<u>General Observations</u>

1. Class sizes are generally equal.

2. Instructional aides are used primarily in continuous progress.

3. Generally teachers of continuous progress classes are those who had experience with continuous progress last year. The fact that a teacher is employing a particular plan (continuous progress or traditional) does not necessarily reflect the teacher's professional preference.

CLE:df

Continuous Progress Class

Time	Teacher behavior	Girl, Packet [illegible]	Boy, Packet [illegible]	Boy, Packet 2[illegible]	Boy, Packet 2[illegible]	Boy, Packet [illegible]
9:15 - 9:30	Teacher tells all students to begin work, and she checks roll. Teacher sits at her desk and students come to her as they need help. Room very quiet.	Student begins work immediately on packet and works for 10 minutes; then opens purse, looks in mirror. Pulls out pocket notebook, reads it, then writes in it.	Sharpens pencil, then returns to seat, opens packet, looks at it, gazes around the room. Continues looking around the room, coloring for rest of class period.	Student opens math packet, looks around the room; stares out the door; begins work at 9:20; stops work at 9:24.	Teacher asks him about his book. He goes to her desk, leaves room, and returns with book. Plays with paper; makes it into a note. Opens book at 9:25; looks around; begins work at 9:26.	Plays with fingers. Takes math packet to teacher's desk. Teacher talks to him. Returns to desk and begins work. Goes back to teacher's desk. she assists him, and he returns to work.
9:30 - 9:45	Teacher moves around room and assists those needing assistance. Teacher goes to board, says "some students have worked the whole packet wrong", so she explains at board.	Student still writing in pocket notebook. Puts away notebook & begins work on her math packet.	Still staring around room. Lays head on desk; raises head and plays with pencil; stares around. Lays head down; raises head and stares straight ahead; looks around room; gets out his notebook; talks to his neighbor and draws on his paper.	Stares around room and talks with his neighbor. Looks at math packet; works on packet and looks around the room.	Works on packet until 9:40. Pulls on his fingers, looks around the room; goes back to work. Teacher comes by his desk and talks to him about his work.	Works on packet, bites fingernails, goes to teacher's desk. She sends him back to his seat. He sits and watches the teacher.
9:45 - 10:00	Teacher is still at the board for about five minutes. She returns to her desk. A student raises her hand, and she goes to the student's desk. Room is very quiet.	Student looks at teacher; teacher asks if she understands; she shakes her head yes; begins drawing on paper; looks at math packet and begins working.	Looks at teacher as she is explaining. She asks him a question; but he doesn't answer; shakes his head no; his neighbor asks him why he didn't answer; he says "cause I didn't want to". Continues looking around the room; talks to his neighbor; teacher comes by his desk and asks why he isn't working; he says "I don't understand". The teacher explains, and he begins working.	Looks around the room; looks at the teacher; then goes to work on math packet; looks around.	Student works for entire 15 minute observation period.	Looks at teacher; draws on paper; teacher comes by his desk and talks to him; he goes to work.
9:00 - 10:15	Teacher moves around the room answering questions. Teacher goes to board and explains a problem for packet 4.	Working on packet. Begins coloring in figure on front of her packet and continues coloring for rest of class period.	Student working on math packet; raises his hand. Teacher assists him; after she leaves, he looks at his watch and begins writing.	Still looking around the room; goes to work; works briefly; glances around continuously.	Works on packet. Takes packet to the teacher when she calls him.	Works on packet. Stops working and looks around rest of the period.

CONTINUOUS PROGRESS CLASS

Time	Teacher Behavior	Girl, Packet 13_1	Boy, Packet 7B	Girl, Packet 7B2	Boy, Packet 7A1	Girl, Packet 6
2:35 - 2:50	The teacher calls the students working on Level 13 to a small group for instruction (9 in the group); they all pull their chairs to the front of the room.	Goes to math center when group working on her packet is called; she observes the teacher at the board.	He sits at his seat and watches the teacher; stares at the teacher and at the board and around the room.	Works on packet; talks to neighbor and works intently.	Works on packet; talks with neighbor; seems very intent working on his packet.	Talks with other students who stops by her desk; she talks to her neighbor and finally begins working.
2:50 - 3:05	Teacher still is at the front of the room with a small group in instruction on Level 13.	She is still in the group at the front receiving individual instruction from the teacher; she observes the teacher and the board and answers questions when she is asked.	Looking around the room; stares as if daydreaming; still not working at the end of this period.	Works intermittently and talks with neighbor; begins working intently about 2:58; continues until the end of this period.	Working intently on packet; goes to pencil sharpener; stops to talk with neighbor on the way; goes to cabinet; asks student aide for material; then returns to seat and begins work.	Talks with neighbor; looks around the room; begins work about one minute; looks around room and talks and laughs with neighbor.
3:05 - 3:20	Still at the front and at the board instructing Level 13 students.	Still in the group receiving instruction at the front; very attentive and observes the teacher at the board and responds occasionally.	Still looking at the teacher and the board and not working, but sitting quietly; looks out the door and waves to another student in the hall; tries to talk to him; stares outdoors; leaves the room to talk to the student in the hall and returns to room.	Working intently, occasionally talking to neighbor; shows another student how to do her math.	Working intently, folds a paper into a note and then begins working on packet.	Still talking with neighbor; playfully hitting back and forth.
3:20 - 3:35	The teacher concludes the group working on Level 13--she has spent the entire period with 9 students at the front of the room--the other students were left basically on their own most of this period.	Still in the group receiving instructions; returns to seat when instructions are finished and begins work; goes to teacher's desk and obtains material and returns to her desk.	Has not worked all period; toward the end of the period he begins work; raises his hand; student aide assists; he begins work for about 1 minute; teacher comes by and asks another student to assist him.	Talking with neighbor and working occasionally.	Sits and stares as if daydreaming for the entire period.	Still not working; goes out in the hallway and talks with another student; returns to room and talks to neighbor; writes briefly on a paper and puts it on the teacher's desk; sh has not worked during the entire period.

APPENDIX J (cont.)

CONTINUOUS PROGRESS CLASS

Time	Teacher Behavior	Boy, Packet 7	Girl, Packet 13	Girl, Packet 6	Boy, Packet 7B	Girl, Packet 7B
9:55 - 9:10	Teacher asks about those with problems in 7A. Then she works problems from 7A on the board. Then she goes to students' desks and observes their work.	Sits quietly and stares around; finally he begins working in his packet.	Works quietly; looks around the room, then continues to work quietly on her packet.	Talks to her neighbor; then begins work on her packet. Goes to the front, looks at material, returns to her seat and begins work; talks to girl across aisle.	Observes teacher at the board. Still observes the teacher; raises his hand and askes a question, and the teacher answers; and he begins work.	Talks to neighbor and works intermittently; she leaves her desk and goes to the table to check her packet; then she returns to her seat and talks to her neighbor about her paper.
9:10 - 9:25	Teacher is passing around the room; she stops at the desks of students who ask for help.	Working quietly on his packet; then he goes to the checking table and works, then returns to his seat.	Working on packet most of the time; she goes to the teacher's desk and gets a protractor; returns to her seat to work.	Working quietly, but not on her packet; she seems to be reading a book; writes occasionally, but is not working on math.	Working; goes to the wastebasket and pencil sharpener; then returns his seat and works.	Talks and works intermittently; talks a lot, but seems to be about math; then she shows her paper to her neighbor.
9:25 - 9:40	Teacher passing around room, assisting those who needed help.	Goes to pencil sharpener, then to the teacher's desk, gets a protractor, uses it, returns the protractor, talks to his neighbor, then starts back to work.	Working on packet; goes to teacher's desk to get protractor.	Puts paper in book she is reading; picks up packet; picks up book and begins reading; talks to her neighbor.	Still working during this observational period.	Works and talks to her neighbor; goes to checking table.
9:40 - 9:55	During this observational period, the students seemed to be getting very restless. Teacher still passing around the room, assisting those who raised their hand.	Asks teacher for review sheet for level 9; he seemed to be organizing his notebook; did not work on review sheet after the teacher gives it to him.	Sits quietly; does not seem to be working; begins working; has worked fairly regularly most of this period.	Goes to pencil sharpener; stops to talk to her neighbor; she has done little math work during this observational period; begins to read a book.	Turns around and talks to student in back; he spent most of this period talking.	Explains something on her math paper to her neighbor; raises her hand; teacher comes by and tells her to go to work; she gets her review sheet, returns to her desk and sits and talks to her neighbor about it. She has done little work; seems to talk as much as she works.

APPENDIX J (cont.)

CONTINUOUS PROGRESS CLASS

Time	Teacher Behavior	Boy, Packet 7A	Girl, Packet 7A	Girl, Packet 7A	Boy, Packet 7B	Girl, Packet 9
2:45 - 3:00	Teacher is instructing group on Level 9 with the students all over the room so it is a bit difficult which group is supposed to be paying attention.	Working on math packet; another student comes by his desk and shows him his paper; then he resumes work.	Working on packet intently; observes teacher working at the board; begins work on packet and then observes teacher.	Looks around the room; begins work; watches the teacher work at the board; works on her packet; looks around the room.	Works on packet; closes packet; plays with it and his pencil; observes the teacher.	Observes the teacher; answers questions when the teacher asks questions of the group; observes as her group is being instructed; answers question; raises her hand when teacher asks question and responds.
3:00 - 3:15	Teacher explains Packet 9 then asks those working on Packet 8 to pay attention; there were only two, so she gives them quick instructions on the board; then walks around room and assists students.	Works on packet; raises hand, receives no response from the teacher, so returns to work; raises hand again, and teacher goes to his desk.	Observes the teacher; looks around the room; talks; looks around the room; raises her hand, and the teacher responds; then she goes back to work.	Working on packet; observes the teacher; works on packet; observes the teacher; goes to pencil sharpener; goes back to work; raises her hand; teacher assists her.	Sits and stares at the floor and out of the room; goes to the teacher and asks a question; gives the teacher his packet and gets a test for Level 7B; returns and works.	Lays down her head and works; observes the teacher; takes off her shoes and loses her shoe under the desk; plays with her bracelet; looks around the room and then works on packet.
3:15 - 3:30	Teacher passes around the room and answers questions.	Working on packet; looks around and goes to the teacher's desk and then returns to his seat.	Working on packet; looks around while in the process of working.	Working on packet continuously and very intently working.	Working on test; goes to teacher's desk and returns to her desk and goes back to work.	Looks around as the teacher instructs the other group; stares into space and then goes to blackboard and reads notices and talks to other students, returns to her desk and looks around.
3:30 - 3:45	Teacher moves around and answers students' questions.	Waits at teacher's desk while she works with others; teacher answers question and he returns to his desk; raises hand; teacher responds immediately, and he returns to work; goes to teacher's desk again and returns to work.	Looks around the room; works on packet; looks around; talks and then works on packet.	Working intently on packet--has been working most of the period; goes to teacher and shows her book.	Works on test most of the period.	Looks around; talks; talks; talks all period, not about math.

CONTINUOUS PROGRESS CLASS

Time	Teacher Behavior	Boy, Packet 6	Boy, Packet 7A2	Girl, Packet 7A4	Boy, Packet 15	Boy, Packet 1?
9:10 - 9:25	The teacher sits at her desk and the students come to her for assistance on their packets.	He begins work immediately on his packet; goes to teacher's desk and she assists him; he then returns to his desk and resumes work.	He goes to the teacher's desk and then returns to work and works diligently.	Reads magazine, talks to girl behind her; then returns to reading magazine; then closes magazine at the end of this observational period and opens her math book.	He locates his material; then goes to the wastebasket, stops by the teacher's desk while she is instructing other students; then he asks to leave the room and the teacher refuses to allow him to, so he returns to his seat and observes another student who is working, and he begins reading in his math book.	He begins work immediately and works very diligently; he seems to like math. When the observer asked him about it, he said that "math was okay, but it was really his easiest, not his favorite subject".
9:25 - 9:40	The teacher is still at her desk answering questions; she goes to the blackboard occasionally and explains to two or three students some questions and after she asks if any more students need this same type of help.	Working on packet; goes to the teacher's desk, and the teacher asks him a question, and his answer is wrong, so she gives him the correct answer; then he returns to his seat and resumes working.	Working on his packet; then he goes to the teacher's desk; then he returns to his seat after she has assisted him, and he opens his math book.	The observer stops by her desk, and she shows him her packet. After he leaves, she talks to the girl behind her and asks her for a pencil; she sharpens the pencil and then brushes her hair; then begins work on her packet and talks to the girl behind her about the packet.	Is working on his packet; observes the boy beside him working; asks him a question about math that he is working and then takes his packet and works on it.	Working diligently; boy in front of him asks him a question about math, and he answers it; then he returns to work.
9:40 - 9:55	The teacher has stayed at her desk and assists students when they come to her desk, four students at a time are usually the most that are allowed at the desk.	Working on packet; then goes to the pencil sharpener and then returns to his desk and goes to work.	Is working; goes to the teacher's desk and returns a book; he asks the teacher a question then he returns to his desk and begins work.	Looks around a great deal; has her packet open, but does not work problems; she talks across the room to her neighbor; plays with her watch.	Is working; talks with his neighbor about math; he works; then he starts to the teacher's desk and returns because there are four other students at her desk; so he asks his neighbor about math.	Working diligently; talks with his neighbor about math; works a problem for his neighbor when he asks for help on a problem; then another neighbor comes by and asks him to show him how to work a problem.
9:55 - 10:10	There are seven students now at the teacher's desk, and occasionally eight; the teacher has stayed at her desk and assisted those who needed help.	Is working diligently on his packet; talks to his neighbor quietly and then goes back to work; he has worked quietly all period.	Is working on his packet; he goes to the teacher's desk, and she explains a problem to him, and he returns to work. He has worked well all period, but he has required a great deal of teacher help.	Still playing with her watch, then she goes to the teacher's desk; stops to talk to another student and then she stands in line to see the teacher; she has played around most of this period.	Goes to the teacher's desk; returns to his seat; he has worked very well all period; he has talked to other students, but has generally talked about math.	Talks to his neighbor about math, and he works; he has worked well all period and has assisted others.

CONTINUOUS PROGRESS CLASS

Time	Teacher Behavior	Boy, Packet 2B	Boy, Packet 2C	Boy, Packet 9	Girl, Packet 4	Girl, Packet 7A
9:00 - 9:15	The teacher has called a small group to the center to work with them individually on packet 4.	He begins work immediately; then looks around room; observes neighbors talking; then returns to work; talks to neighbor; works for approximately ½ minute, then talks to neighbor again; then seems to be working on packet.	Stares around the room and doesn't begin working immediately; when he does begin, he works for about ½ minute, then he looks around the room plays with the edge of his paper; still not working 12 minutes after the class begins; picks up packet, but does not work.	Working intently; raises his hand at 9:03 and asks question; is assisted at 9:05 and returns to work and works intently.	Goes to math instructional center; raises hand and asks question; raises hand again and asks another question. Returns to work.	Works on packet; she stops and talks to neighbor; looks around the room; goes back to work; watches teacher with a group at the board; stares around the room and talks to neighbor.
9:15 - 9:30	Completes working with the first group in small group session and calls for another group of students to the center.	Working intently on packet; talks to neighbor; then returns to work.	Looks at packet pages; looks around the room; sits with pencil poised and daydreams; neighbor asks him if he is finished; he shakes his head no; neighbor looks at his paper and tells him something, and he erases and writes; goes to teacher's desk and when he is not given any help, he returns to his desk; and then goes to center when his group is called.	Working intently; still working at the end of 12 minutes; goes to get answer sheet and returns to his seat, raises his hand; goes to the front of the room and gets something and sits at the teacher's desk and works.	Still at center for group instruction; raises hand and answers question; goes back to seat and begins work on packet.	Working on packet; looks at teacher working at the board with the other group.
9:30 - 9:45	Teacher works with the group in the center, and for the last five minutes of this period, she goes around the room assisting students as they raise their hands.	Still working on packet; talks to his neighbor occasionally and then returns to work; begins drawing on his paper making the letter "j" on his paper; folds the paper and puts the pencil in his mouth and goes to the wastebasket and returns to his seat; looks around.	Stares at the board and at the teacher as she works; shakes his head when the teacher asks a question; then returns to his seat and looks at his packet.	Returns to his seat and raises his hand; student aide responds; he picks up his packet and takes it to the teacher; then leaves the room with his packet.	Working; looks around the room; goes back to work and works with her head down.	Working on packet; she looks at the teacher giving instructions; raises her hand; teacher goes to her and answers her question; she returns to work.
9:45 - 10:00	The teacher responds to raised hands, but she is unable to get to all of the students.	Talking to neighbor; raises his hand; and he is still waiting at the end of the period for assistance, but the teacher has not had time to respond.	Working on packet; looks around the room for the remainder of the period.	Still out of the room during the entire period.	Looking around the room; raises her hand; no response from the teacher, so she returns to work.	Working on her packet; she has worked very well all period.

CONTINUOUS PROGRESS CLASS

Time	Teacher Behavior	Girl, Packet 11	Girl, Packet 11	Boy, Packet 12	Boy, Packet 8	Girl, Packet 7A
2:40 - 2:55	Teacher explains something regarding Packet 7A at the board spending approximately seven minutes during this time; then moves around the room assisting students.	Working on packet the entire period.	Working on packet the entire period.	Working on packet the entire period.	Talks and glances at his neighbor; looking at the teacher to see if she is looking; he laughs at his neighbor; teacher asks him to move; moves with a great deal of commotion; dropping his books and talks to others; rocks back and forth in his chair.	Looks at teacher who is working at the board; then she begins work with a lot of looking around.
2:55 - 3:10	The teacher moves around the room assisting students as needed.	Working on packet; raises her hand, and the teacher goes to her desk and assists her; she returns to work.	Talks to neighbor about her work; then works diligently; talks to neighbor about math; then talks to neighbor on the other side, but not about math.	Working diligently on her packet; seldom looks up.	Talks with neighbor; teacher stops at his desk and opens his book, but as soon as the teacher leaves, he begins talking again; finally he begins work; teacher comes by his desk and talks to him; he goes to teacher's desk and gets protractor.	Looks around the room a great deal, not working.
3:10 - 3:25	The students become very restless; an announcement is made over the loudspeaker by the principal that the period will be cut short, and they will go to their homerooms.	Goes to the teacher's desk and gets sheet of math work; returns to seat; seems to be checking on packet; takes checksheet back to the teacher's desk, and shows her the paper.	Observes her neighbor; talks and works intermittently.	Has worked well all period and is working quietly.	Raises his hand, and the teacher goes to his desk; he has played around all period; then he goes to the teacher's desk and asks a question.	Sits quietly and working occasionally on packet; looks around the room a great deal, and the teacher goes by her desk and talks to her.
3:25 - 3:40	The teacher assists those who raise their hands.	Talks to neighbor; and the neighbor draws on her hand.	Talks to neighbor.	Continuing to work.	Works briefly; raises his hand, and the teacher assists him. Has worked very little.	Working on packet.

CONTINUOUS PROGRESS CLASS

Time	Teacher Behavior	Girl, Packet 7B	Boy, Packet 7B	Boy, Packet 7B	Girl, Packet 6	Boy, Packet 9
10:35 - 10:50	The teacher handed out tests to those who needed to take them; then she called those in Level 9 to the board and discusses the packet and writes on the board. There were only two students in this group. When she completed work with them, she called the students in Level 8 to the board for instruction, and there were 6 students in this group. The students were not working at the board; the teacher worked at the board and the students are seated in front of it.	Talks with others; works on packet; goes to pencil sharpener; returns and talks along the way; talks and looks around a lot; begins to work.	Working quietly and intently during the entire period.	Working on paper, and he occasionally watches the teacher at the board and does not seem to be able to go to work; he looks around a lot; draws on his paper and then lays down his head.	She works on her packet quietly; then she goes tothe waste-basket and the pencil sharpener; returns to her seat and lays down her head; punches the boy in front and talks to him.	Goes to board when the teacher calls for those in Level 9; pays close attention at the board and then returns and works intently.
10:50 - 11:05	The teacher is working with students in Level 8--she gives an excellent explanation. When she completes working with this group, she moves around the room and answers questions of those students who need assistance.	Working quietly during the entire period.	Working intently in the period.	Sits quietly and stares at his paper. He still is not working; seems somewhat perplexed as to what he should do; raises hand as soon as the teacher completes with the group, and the teacher does not respond; so he goes to the teacher's desk.	Seems tobe working on her packet; raises her hand, and the teacher responds.	Says something to his neighbor, and he returns to work and works quietly the rest of the period.
11:05 - 11:20	The teacher had asked for those students in Level 7B as she uses the over-head to give them instruc-tions rather than calling them to the front of the room as a group.	Continues working; she seems to be working pro-blems on her test.	Sits and stares and observes the teacher; he seems to be paying attention.	The teacher assists him; he returns to his seat and begins working, but he moves to the front when the teacher calls for those in Level 7B. He observes the teacher closely; answers questions when asked; raises hand and asks questions and teacher answers.	Working on packet; organizes notebook; reads school newspaper; gets out packet and looks through her book.	Watches the teacher and the overhead although he is in a higher level; books are closed as he observes the teacher and looks around the room.
11:20 - 11:35	The teacher gives problem solving problems (this is the first time this observer has seen problem solving problems ex.: 14 mi. gal--how far could one go with 9 gal. gas) When the students were finished with this one, she gave another problem solving question which was if you went to the store to buy $50 dress, and it was 25% off, how much would it cost. These were group questions directed at the students in Level 7B.	Observes the teacher as she instructs the group working on Packet 7B.	Observes the teacher; opens her packet and seems to pay close attention.	Observes the teacher and responds to the group questions asked.	Closes her books; looks around the room; lays her head down on her desk.	Looks around; he is still not working.

CONTINUED CLASSROOM CHART

Time	Teacher Behavior	Girl, Table 1	Boy, Table 1	Girl, Table 2	Boy, Table 2	Girl, Table 2B2
12:30 - 12:35	The teacher has taken three students to the board and explained a problem on the board and she has moved around the room to assist those who needed help.	Looked around the room; worked packet a- all.; laid her head down on her desk; and the teacher comes by and talks to her, and she opens a book.	Raises hand; student aide assists him; he goes back to work; he goes to the table to check his work; goes back to his seat; goes to the teacher, and she assists him.	Works on packet sheet and student aide comes by and assists her when she raises her hand; she tells him what she wants, that she wants the teacher to help her, so she raises her hand again, and the teacher does not help, but she observes the teacher at the board; goes to the teacher, and then the teacher assists her.	Goes to the board as the teacher calls for a small group to work in Packet 3. Three students respond; he stands at the board as teacher explains to the small group; he returns to his seat; on his way, he talks to his neighbor and punches the boy in front of him.	Raises hand, and the teacher goes to assist her; after the teacher leaves; she goes to the center of the room; does not seem to know what to do; she laughs and talks to the boy next to her; looks around the room.
12:35 - 12:45	The teacher has been moving around the room assisting students as needed.	Sits quietly and reads a book; reads the entire period.	Working on problem from book; goes to the checking table; checks work and returns to seat and works; raises his hand, and the student aide assists him; he goes back to work and goes to work center and checks his work again and returns to seat; talks to neighbor.	Goes to teacher aide and is given a test at the test center; begins work.	Still playing around with the boy in front of him; gets up and goes to the pencil sharpener, returns to his seat; opens his packet; looks through packet; pokes the boy in front of him and talks to him. Teacher comes by his desk; he says something to teacher.	Moves to another seat and begins work on her packet. She works diligently on the packet for a short period of time, then gets up and goes to the pencil sharpener.
12:45 - 1:30	The teacher is still moving around the room assisting students as needed.	Still reading a book.	Raises his hand; teacher goes to his desk and assists him. He continues working on his packet; then he goes to the teacher and she sends him to her desk for a ruler. He uses the ruler and returns it to the teacher's desk. Goes to test center and gets the test answer sheet from the aide. He checks his test paper and begins working diligently.	Working diligently on her test.	The teacher goes to and tells him he is to work or leave the room. He looks through the packet, taps on his desk, looks at his neighbor's paper and then writes in his packet.	Teacher stops by and the student asks a question, and the teacher responds. She goes back to work, looking around the room a great deal of the time, but does seem to be working.
1:30 - 1:45	The teacher has been moving around the room assisting the students as needed.	Still reading a book. She has been reading most of the period.	Returns his test answer sheet to the aide; he has completed his work, so he talks to his neighbor, and the teacher gives him a review sheet. He has worked very regularly all period.	Working on a test. Completes the test and turns it in to the teacher; then he talks to his neighbor, so the teacher tells him to get a review sheet from the aide; he has worked fairly well all period.	Looks around the room and when the teacher comes near, he asks her a question. He has not worked at all during this period.	Working on something; goes to the wastebasket; talks to others as she passes; she has done very little work all during the period.

Note: There is one student aide and one parent aide in this classroom setting. There are two teachers; however, each teacher is one end of the classroom--in the center of the room is a blackboard which partitions the room and also serves as a testing center. So instead of one team teaching situation, there are two self-contained classrooms in the same building.

TRADITIONAL CLASS

Time	Teacher Behavior	Girl	Boy	Girl	Girl	Boy
10:30 - 10:45	The teacher works problems from their homework on the board; then works some new problems for the students.	Watches teacher as problems are worked at the board.	Checks his work as problems are worked at the board; raises hand; asks question; goes to board to show the teacher what he means about borrowing.	Watches as problems are worked and plays with her beads.	Works on problems as the teacher works it on the blackboard; raises hand and asks the teacher to work problem from homework on the board.	Looks through notebook; answers the teacher's question as she works the problem on the board and writes as the teacher works the problem.
10:45 - 11:00	The teacher is working at the board, asking group questions and calls on students to answer them.	Gets out book and paper; reads problems and when requested, raises hand to answer question, but she was not called on.	Gets out book and paper and watches the teacher at the board.	Gets materials and watches the board as the teacher works.	Shares book with neighbor; raises hand and answers question the teacher asked.	Looks at the paper and not at the teacher; answers question when teacher calls on him; raises hand in response to a group question several times but was never called on.
11:00 - 11:15	The teacher is moving around the room, showing test grades from the day before and makes assignment for tomorrow.	Puts heading on paper as instructed by the teacher; watches teacher at the board; raises hand, but not called on; begins work; the teacher comes by her desk and shows grade from test from the day before; she returns to work.	Does as instructed; watches the teacher at the board; begins work on assignment; the teacher comes by and shows test grade; returns to work.	Does as instructed; watches the teacher at the board; plays with beads; begins work; teacher comes by and shows test grade; returns to work.	Does as instructed; watches teacher; works on assignment; teacher comes by and shows test grade, and she begins work on assignment.	Begins work; works on assignment; teacher shows test grade; works on assignment; tears up paper after looking at it; throws it up and catches it.
11:15 - 11:30	Teacher is moving around the room, assisting those who raises their hands for help.	Works on homework; teacher assists her on problem; returns to work.	Raises hand; teacher assists immediately; resumes work; teacher goes by desk and assists; resumes work.	Raises hand; teacher assists; works; raises hand; teacher responds approximately 3 minutes later; shows her; resumes work.	Works on paper; teacher looks at work; shows her problem that was wrong; works; talks to neighbor; goes back to work.	Goes to wastebasket and throws away paper and returns to seat and resumes work.

TRADITIONAL CLASS

Time	Teacher Behavior	Boy	Boy	Girl	Girl	Boy
2:30 - 2:45	Busy at the blackboard discussing the metric system. Gives excellent discussion on metrics.	Looks at teacher and blackboard as teacher explains the metric system.	Looks at teacher; talks to neighbor; plays with fingers and taps on book.	She looks at the teacher, then stares into space; does not seem to be listening.	Talks to another girl across the way; she taps on her desk, talks to the girl in front of her; looks in her purse and pulls out her comb and combs her hair. She has not paid attention during this period.	Observes teacher and asks question.
2:45 - 3:00	Concludes discussion on metrics and asks about homework that was to be prepared for today.	Writing on paper; looks at teacher occasionally; talks to neighbor; listens to teacher and begins writing.	Still playing with his hands and desk; not paying much attention and occasionally talks to neighbor.	Begins drawing in book; looks like she is daydreaming; occasionally looks up at the teacher.	[illegible]s the girl in front; writes on desk; talks to others; plays with hair of girl in front; pulls chair of girl in front.	Working on a paper in math; continues working on math paper.
3:00 - 3:15	Teacher goes back to blackboard to discuss the problems of long division.	Looks at hands; looks around at others; writes occasionally; seldom looks at teacher; seems to be drawing on paper; observes teacher occasionally and talks to neighbor.	Talks with boy next to him. Looks at teacher; plays with boy next to him; continues talking; plays with pencil; drops it; raises hand and asks to leave; teacher tells him to wait.	Sits and stares into space or draws on paper.	Opens notebook and writes; seems to be copying work from someone's notebook; taps girl in front and talks; then returns other student's notebook.	Still working on a math paper; wads up papers, drops on floor; looks at teacher and board.
3:15 - 3:30	Teacher assigns homework, then goes around the room assisting students as they raise their hands.	Goes to work on homework; gets up; talks to some other students; sits down and talks; goes to wastebasket; sits and talks. He has done little work during this period.	Talks to neighbor; continues talking for long period of time. He has not worked or paid attention during the observational period.	Goes to teacher's desk and asks for paper; returns to seat and starts working; works less than a minute and tends to be daydreaming; stares at pencil. She has not work or paid attention during this period.	Blows bubbles and plays with gum; gets up; pats other students on head; talks; takes out candy and eats it.	Begins work immediately on homework; works occasionally, but does not seem to pay attention.

APPENDIX K (cont.)

TRADITIONAL CLASS

Time	Teacher Behavior	Girl	Boy	Girl	Girl	Boy
10:25 - 10:40	The teacher used the transparency machine and discusses parallel lines (this seems to have been their homework from the day before).	She looked around the room; looked at the teacher occasionally; looks around at others continues to stare around the room; she answers a question the teacher asks to the group.	Looks down but his book is not open nor is his homework visible; has not looked at the teacher or his book during this period; he begins counting his money.	She has her book open and she observes the teacher as she is discussing the math problems.	She has her book open and she observes the teacher and looks at her book as needed.	He opens his book and sits quietly; he raises his hand; the teacher asks if he has a question, but he shakes his head no.
10:40 - 10:55	The teacher has made assignments and walks around the room assisting students as they raise their hands.	Begins work as assigned; she raises her hand.	Goes to the teacher's desk and asks to leave the room; he returns to the room at 10:54.	Begins work immediately; raises hand, and the teacher goes to her desk and assists her.	Begins work; she goes to the pencil sharpener; returns and immediately goes to work.	Begins work on his assignment.
10:55 - 11:10	The teacher is moving around the room and assisting students as they need help.	The teacher still has not responded to her, but she goes back to work; she goes to the teacher's desk and puts a paper on it and talks to a neighbor on her way back to her seat; returns to her seat and goes back to work.	Plays around with a clip on his pen; makes a noise; raises his hand, and the teacher responds; he asks where he is supposed to sit, and she tells him to go to work; he sits and talks, and the teacher goes by his desk and shows him something on a paper.	Working on her homework; raises her hand about 11:00, the teacher does not respond until 11:11.	Working diligently on her homework; she raises her hand, the teacher finally comes to assist.	Working intermittently on his homework; he looks around a lot; raises his hand, and the teacher responds and assists for about two minutes; then he goes back to work.
11:10 - 11:20	Teacher is moving around the room and assisting students as they need help.	Working quietly on her homework--she has worked most of this period.	Talks occasionally, and he works occasionally, and the girl in front of him assists him with his homework. He has worked very little during this period.	Hand was still raised at the beginning of this period; it took the teacher 11 minutes to respond; she resumes work and after the teacher has responded, she has worked well all period.	Works diligently; she has been working all period.	Gets up; goes to the front of the room; talks to another student at the door; gets his assignment and talks to teacher; he has worked intermittently during this period.

TRADITIONAL CLASS

Time	Teacher Behavior	Boy	Girl	Girl	Boy	Boy
1:25 - 1:40	The teacher explains problems on the board.	Watches teacher attentively; does respond to teacher's questions asked of the group.	Watches teacher attentively; lays her head on the desk; covers her eyes; raises her head and observes teacher; raises her hand and answers a question; raises hand again and answers a question.	Stares at the back of the seat in front of her and talks to neighbor; observes the teacher; looks around; responds with the group to a question and talks with her neighbor.	Watches teacher attentively; marks on the back of the girl's dress in front of him; lays his head on his desk, observing the teacher; plays with his hands; seems somewhat bored.	Plays with paper; gives most of his attention to the paper; occasionally looks at the teacher; does not participate, but does begin working on a paper which is in his math book.
1:40 - 1:55	The teacher assigns some problems which takes up seven minutes; during this period of time the students are moving around the room, talking, sharpening pencils, etc. It is a very noisy room.	Watches the teacher and responds to a question; attentively looks at the teacher at the board and responds; goes to pencil sharpener; returns to work and talks to neighbor.	Watches the teacher and responds to two questions from the teacher; talks to neighbor; goes to sharpen pencil and talks to neighbor on the way.	Talks to neighbor for quite a while; points pencil at the boy in front of her and pretends to stick him and then laughs to her neighbor about it; walks around room and talks to others; continues most of the period.	Looks at fingers; glances at teacher; goes to talk to the teacher; is given test he has taken before; returns to seat and talks to neighbor; then he opens his book.	Working on paper, not looking at the teacher, continues working on paper, asks the other observer a question and then returns to work.
1:55 - 2:10	Work has been given by the teacher, and the students are to work on their own; there is a great deal of talking and moving around in the room during this time.	Slides back seat and works with his neighbor talking, moving around the aisle, continuing to talk with others as they continue to work on problems together.	Talks to neighbor; he leaves the room; when he returns, he begins work and talks to neighbor a while and then writes on his neighbor's paper; works on problems; talks; goes back to work; talks.	Looks around the room; talks to neighbor; works on problems; goes to teacher asking a question; talks; works; talks; works.	Begins work; watches as the teacher shows his neighbor a problem in response to question; works on problems; works and talks.	Teacher looks at his work and states that he way ahead of the others; he works quietly; he goes to the teacher and asks a question; returns and works; returns to the teacher; returns to his seat and works.
2:10 - 2:25	The teacher is passing around the room--the students are working on their problems for tomorrow--trying to keep order and assisting those that need help.	Raises his hand and watches the teacher as he instructs student behind him; teacher gives some group instruction, and he lowers his hand; talks to neighbor.	Works on problems; looks around; shows paper to girl behind her; talks and talks; leaves the room.	Goes to teacher; shows paper; returns to seat and works; listens to neighbor; talks and talks; asks to leave; returns and works.	Works on problems; talks to neighbor; asks teacher a question; returns to seat and begins to work and is still working at the end of the period.	Goes to teacher and asks a question; returns to seat and works and is still working at the end of the period.

TRADITIONAL CLASS

Time	Teacher Behavior	Boy	Girl	Boy	Girl	Boy
1:20 - 1:35	Teacher works the homework problems on the board; classroom is very quiet.	Busy coloring figures on book cover; continues working on bookcover during the entire period.	Observes the board and teacher and writes as if comparing homework with the work on the board.	Observes the board and the teacher.	Works as if doing homework; not paying too much attention to the teacher.	Observes the teacher and the board.
1:35 - 1:50	The teacher gives homework assignments; answers some questions; explaining answers to homework.	Continues writing on his bookcover; finally checks his paper as the teacher calls out the answers and passes his homework when called for.	Checks her paper as the teacher calls out the answers and then passes her paper.	Lays down his head; there is no response when there is a call for the papers.	Checks her paper as the teacher calls out the answers; talks to neighbor then passes her homework.	Talks to his neighbor; lays down his head as the teacher calls out the answers and raises his head and writes on his paper.
1:50 - 2:05	The teacher is at the board explaining problems; makes assignments, and at 1:55, the students begin working; the teacher goes back to the board to explain answers to some of their questions.	Goes back to marking on bookcover then turns to a page in the book as the teacher directs and begins work on the homework assignment for the next day as directed by the teacher; stares out the window for the rest of the period.	Sits quietly; folds her paper into a note and passes the note across the room; goes across the room to talk; the teacher asks about a book and she said she left it at home; so works with another student on the book.	His head is still on his desk; the teacher calls on him to watch, so he raises his head and looks at the teacher; he asks to leave the room; when he returns, he sits quietly and observes the teacher.	Sits quietly; writes occasionally; observes teacher at the board; reads notes; smiles; talks with neighbor; goes to wastebasket.	Marks on his bookcover; does not look at the teacher; asks the teacher a question after going to her desk and then returns to his seat.
2:05 - 2:15	The teacher returns to the board and explains problems; there is very little pupil interaction, mostly teacher explaining homework problems on the board.	Observes the teacher occasionally; plays with pencil and paper; looks in his pocket; does not work during the entire period.	Works on paper and observes the teacher.	Observes the teacher; tells his neighbor to "shut up".	Observes the teacher; asks questions about problems; talks to neighbor; begins work on homework; raises hand and asks question about homework assignment and discusses it with teacher extensively.	Works the entire period on homework assignment.

TRADITIONAL CLASS

Time	Teacher Behavior	Girl	Boy	Boy	Boy	Girl
8:50 - 9:05	The teacher was at the blackboard working problems. This was the only class observed where the students laughed and seemed to be paying attention to the teacher, but seemed to be enjoying their work.	Answers teacher's question that is asked to the group; she observes the teacher; answers questions that the teacher asks of the group again.	Sits quietly and observes the teacher at the board during the entire period.	Observes the teacher at the board and works on his paper during this period.	Observes the teacher at the board during this period.	Observes the teacher; looks around the room a lot; seems to be reading the school newspaper.
9:05 - 9:20	The teacher assigned problems to be worked and turned in at the end of the period. A great deal of commotion was made as they started work, and it took about five minutes for the students to settle down. The teacher goes around the room assisting.	Begins working a little; talks with others; she works, but she talks with others; she asks a question of another student on how to work a certain problem.	Begins work immediately and shows another student how to work a problem.	Looks around and talks. He does not begin work immediately.	Begins work with a little talking; he raises his hand, and the teacher comes by to assist.	Talks with another student; shows her the school newspaper that she was reading; talks with others about their work.
9:20 - 9:35	The teacher explains to one student, using the blackboard, some problems. A great of pupil interaction about the homework has been taking place.	Shows another student how to work a problem and asks another student about a problem, and she shows her; the student comes by her desk and she shows her again; she talks with another student about social events.	Explains the problem to another student; he assists another student who comes by his desk.	Looks around and talks with his neighbor; he works occasionally; asks the teacher about a problem, and she shows him how to work it.	Is working fairly intensely; he talks occasionally to his neighbor.	Begins working on the problem and works quietly; goes across the aisle and looks at another student's work.
9:35 - 9:50	There is a great deal of laughing and talking in the room. The teacher is going around assisting students as they raise their hands or call to him.	Copies one problem from another student's work; calls across the room to the teacher; calls again to the teacher, and the teacher assists her; the girl across the aisle pinches her; they talk and laugh.	Sits and looks around; starts to work; goes to the teacher's desk and they discuss a problem; returns to seat and assists another student.	Looks around and talks a lot; he seems to work very little.	Talks and works intermittently throughout the period.	Talks to the student who stops at her desk; shows her how to work some problems.

TRADITIONAL CLASS

Time	Teacher Behavior	Girl	Girl	Girl	Boy	Boy
12:15 - 12:30	The teacher does the usual housekeeping duties and goes over the homework paper from the day before.	Talks to neighbor and looks around; pays attention as the teacher explains a problem.	Begins work immediately and continues working as teacher explains; looks at the board; responds to the teacher as the group is asked questions; goes back to work.	Goes to teacher's desk and has card signed; pays attention to teacher; looks around the room; looks at the teacher and the board.	Begins work immediately and continues working as teacher explains at the board; observes the teacher, continuing to work.	Begins work immediately paying attention to the teacher; raises hand when question is asked of the group and observes teacher.
12:30 - 12:45	The teacher explains at the board.	Sits quietly and observes the teacher and opens her book as directed.	Continues writing; does not look at the book as directed; looks up as a question is asked; raises her hand when teacher asks the group a question, and her hand is still raised at the end of the period.	Looks at her book as directed.	Continues writing; does not follow the teacher in the book; looks at the teacher and the board.	Looks at the teacher and book as directed.
12:45 - 1:00	The teacher assigns problems for homework for the next day; the room is very quiet and the children raise their hands whenever they need help.	Begins work immediately on assignment.	Talks to neighbor; explains math; raises her hand and when she gets no response; returns to work; neighbor asks question and she responds then continues working; raises hand and teacher responds.	Stares into space; begins work and goes to the pencil sharpener and talks to neighbor and returns to seat and begins work.	Looks around and begins work; asks question of the teacher; raises hand and gets no response, so returns to work.	Begins work immediately.
1:00 - 1:15	The teacher moves around the room assisting students as they need help.	Continues working.	Assists neighbor and the teacher comes by and assists both.	Working continuously.	Works intermittenly and looks around a great deal.	Works intently during the entire period.

TRADITIONAL CLASS

Time	Teacher Behavior	Boy	Boy	Boy	Girl	Girl
1:15 - 1:30	Gives the children a lecture on learning and paying attention; then she begins discussing fractions.	Looks back at boy behind him and talks; lays down head; glances around the room; no book, paper or pencil.	Looks at the teacher as she talks; sits quietly and observes during this period.	Looks at teacher; spends time looking for pencil and then drops it, rolls it around in his hand; still playing with clay during the period.	Looks at teacher; looks around and plays with something that looks like clay.	Looks at teacher occasionally and then at her paper.
1:30 - 1:45	The teacher takes up the homework and gives assignments; she passes around the room and assists students.	Goes to teacher's desk and asks to go to his locker; when she refuses, he says, "I'm sleepy anyway" and lays down his head; then he calls to a boy outside the door; goes to wastebasket; the teacher stops him and sends him back to his seat; he does not begin working.	Passes his homework and opens notebook and writes; goes to board and copies problems and goes back to seat and works.	Asks for paper from his neighbor; he has no book, pencil or paper on his desk; he talks to neighbor; the teacher talks to him about having no book; he looks around the room; then leaves the room to get his book.	Playing with clay; gets out her book and writes; seems to be working on assignment but plays with the clay occasionally.	Talks with neighbor; passes homework and begins writing; works on assignment; teacher comes by and asks a question; she continues working on her assignment and talks with her neighbor about the assignment.
1:45 - 2:00	Teacher passes around the room helping individual students; at 1:52 teacher began lecture on new materials which was rational numbers.	Leaves the room to get his book; returns at 1:54 with his notebook, but no textbook and begins drawing a picture.	Working on assignment; does not pay any attention to the teacher.	Returns to room with book; stops and talks to neighbor on his way; teacher passes by his desk and says something to him, and he begins working; goes to the teacher and hands her the pass used when he left the room; returns to seat; stands up; goes to wastebasket; does not pay any attention to the teacher.	Working on assignment; she raises her hand; teacher assists her; plays with clay; she does not seem to be paying attention; talks to neighbor.	Working on assignment; talks to neighbor; returns to work immediately; looks around the room and talks, but does not seem to be paying attention.
2:00 - 2:15	Teacher passes around the room or sits at the desk and answers individual students' questions as asked.	Drawing a picture; still drawing at the end of this period; he has not worked the entire period.	Working on assignment during entire period; has worked fairly consistently all period.	Looks around occasionally and at book; fools around a great deal talking or looking at neighbor; has not worked all period; the teacher stops by his desk and explains something.	Writing as on assignment; has been working somewhat off and on all period; the teacher goes to her desk and assists.	Writing on assignment; has worked most of the class period; stops to talk to other students, but it seems to be about math.